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CONTENTS

A Case for Congressional Action 35

Russia Expands Production to Meet Post War Demands 36

FHE Decision Calls for Congressional Action 37

Ask Legislation on Drilling Costs 38

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WHAT'S NEW IN OIL INDUSTRY EQUIPMENT

A-1 Bit & Tool Co. Ltd. 39
Allis-Chalmers Mfg. Co. 62
American Locomotive Co. 43
American Steel Dredge Co. Inc. 45
Baroid 39-61
Blackmer Pump Company 58
S. R. Bowen Company 66
Braden Winch Company 67
Brown Fintube Company 42
Bucyrus-Erie Company 56
George Butler Co. 56
Cardwell Manufacturing Co. Inc. 59
Chain Belt Company 40
Clark Bros. Co. Inc. 65
Climax Engineering Co. 58
Cooper-Bessemer Corp. 50
Cummins Engine Co. Inc. 57
Darling Valve & Mfg. Co. 62
Davey Compressor Co. 61
Dresser Industries, Inc. 55
Driv-Lok Pin Company 40
Eastern Engineering Co. 54
Electro Products Labs. 41
Emsco Derrick & Equipment Co. 49-51-64
Engineering Laboratories, Inc. 53
Engineering Specialties Co. Inc. 48
Foster Wheeler Corporation 44-47
Foxboro Co. 52
General Electric Co. 52-67
Globe Oil Tools Co. 66
Grinnell Co. Inc. 56
Hammond Iron Works 67
Industrial Engineering Co. 42
Ingersoll-Rand Co. 54
International Derrick & Equip. Co. 43
Johns-Manville 42
R. G. LeTourneau Inc. 61
Lincoln Electric Co. 63
Lufkin Rule Co. 63
Manning, Maxwell & Moore, Inc. 63
Marco Company, Inc. 47
Martin-Decker Corp. 46
Lee C. Moore & Co. Inc. 45
National Foam System, Inc. 52
Nelson Specialty Welding Equip. Corp. 44
Ohio Injector Company 48
Oil Trading Company 65
Otis Pressure Control, Inc. 41-48
Pacific Pumps, Inc. 59
Pesco Products Co. 53
J. P. Ratigan 40-55
Reed Roller Bit Co. 54
Geo. D. Roper Corp. 44
Sarco Co. Inc. 57
Security Engineering Co. Inc. 41
M. B. Skinner Co. 43
Taylor Instrument Companies 60
Unit Rig and Equipment Co. 60
Viking Pump Company 53
Wailes Dove-Hermiston Corp. 63
Willamette Hyster Co. 55
Wilmington Chemical Corp. 62
X-Pando Corporation 49
John Zink 46

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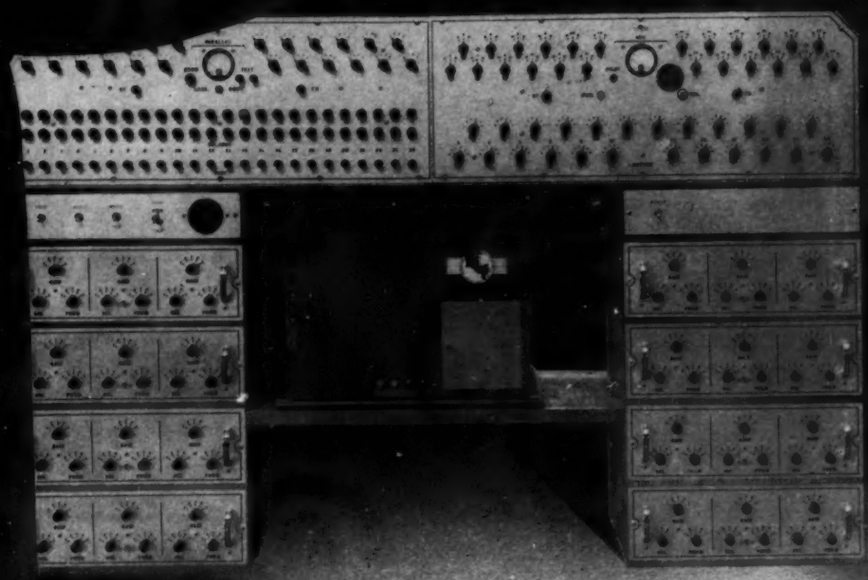

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EDITORIAL

A CASE FOR CONGRESSIONAL ACTION

NOW that the oil industry has had time to study the decision of the Circuit Court of Appeals in the F. H. E. Oil Company case, certain aspects of the decision emerge in a somewhat different light from that in which they were first presented in news reports. Contrary to general impression the case was not fought over the legality of "expensing" or capitalizing the cost of drilling unproductive wells at the option of the taxpayer. The point at issue was whether such cost was a deductible expense under the particular form of contract governing the specific drilling operation involved. Narrowed to this consideration some legal authorities hold that there was a sound basis for the court's finding since the contract was not in the usual form. Had the opinion been limited to a determination of this question it probably would have attracted no widespread attention and certainly would have created no particular concern.

The broader question of the authority for exercising this option in any and all cases was interjected by the *obiter dictum* of Judge Sibley who declared that the regulations under which the drillers of wells for many years past had been allowed to choose whether intangible drilling costs should be charged to current expenses or capitalized and absorbed through depreciation had no legal authorization, that it was not specifically provided in the statute and consequently that all such costs under all circumstances must be capitalized and recovered over a period of years through depletion. It is significant that one of the other judges sitting in the case. who concurred in the decision affecting the F. H. E. Company, did not add his concurrence to the broader generalization thus stated.

The question whether or not the original revenue act provided clear authority for offering a choice in the treatment of intangible expense is one that legal experts conceivably might argue about for years without reaching complete agreement. The fact, however, that the regulations of the Treasury Department have permitted these alternative methods during the past twenty-five years and that Congress within that period has reenacted the revenue measure several times without questioning or altering the regulations establishes a body of precedent to which courts ordinarily would give substantial weight. Although the Treasury Department on several occasions has applied such pressure as it could in an effort to induce the national legislature to alter the provisions applying to allowances for depletion and depreciation Congress has consistently refused to make these changes. No longer ago than 1942 the whole subject was covered at length before the House Ways and Means Committee and lengthy arguments were submitted by Treasury officials advocating a drastic revision of depletion and depreciation allowances but Congress again declined to modify the established practice, a fact that Judge Sibley apparently overlooked. The action of Commissioner Nunan in stating publicly that the regulations heretofore followed will continue in effect unless or until a change is supported by further judicial authority and that in any case the alteration will not be made retroactive except by specific direction from Congress reflects the opinion that the practice heretofore followed expresses the will of the legislative body.

Either through a rehearing of the case or an appeal to the Supreme Court a judicial clarification of the question undoubtedly can be had in time but court procedure is inevitably slow and months if not years may elapse before a final determination can be reached. Meanwhile, a vast amount of damage may ofbe caused by the natural unwillingness of oil companies to assume the risks of heavy loss by carrying on drilling operations in face of the uncertainty that has been created. As a matter of fact, reports of the suspension of drilling and the stacking of rigs began to be received as soon as the action of the Fifth Circuit Court was made known.

Much more than the interests of oil companies or individual drillers is involved in this matter. At a time when the extension of exploration and the enlargement of available petroleum resources are of vital importance to the national economy it would be doubly unfortunate to have the progress of this work interrupted even temporarily. Under these conditions the logical and indeed the imperative course to be adopted is to obtain from Congress a clear-cut and unequivocal declaration of its will in favor of the maintenance of the practice heretofore followed. Reaffirmation of its stand by the national legislature may not be necessary from a strictly legalistic viewpoint, but it will restore confidence more quickly and completely than any other course that can be adopted. If the legislators are convinced of the urgency of the matter there need be little delay for they have before them a choice of several bills designed to effect this purpose. To bring about such a declaration should be the immediate objective not only of oil men but of all those who have the nation's welfare at heart.

RUSSIA EXPANDS OIL PRODUCTION TO MEET HUGE POST WAR DEMAND

Moscow (By Cable) **By Raymond Davies**

INTENSIVE activity marks the operations of the Soviet oil industry on fronts extending from the Polish and Czechoslovak borders to the Far East. As military reasons for maintaining secrecy over these activities become less compelling with the defeat of the enemy in sight, more information regarding oil developments is being released and published though exact statistics and details regarding some types of installations are withheld. Facts available indicate, however, that during the past year the country substantially exceeded its pre-war production and that in oil as in all basic industries it will emerge from the war greatly strengthened and ready to start on a new era of rapid expansion.

Although the Nazi invasion of 1941 and 1942 reached almost to the shores of the Caspian the oil fields that suffered actual damage in the area of occupation were of relatively minor importance. They included areas of small production in the Ukraine and in the district about Krasnodar. The one field of consequence that was the scene of serious destruction, first by the Russians when they relinquished it and later by the Germans when they were forced to retreat, was Maikop. Although the invaders brought in drilling equipment and workers they never obtained any oil from Maikop because of the constant harrassment to which they were subjected by guerilla fighters and as soon as they evacuated the area the Russians set to work to restore the field to normal production. At Grozny production was curtailed when the enemy approached within a dozen miles but the invading forces did not succeed in getting possession of that field. Whatever recession took place in the affected areas has since been largely made up by drilling crews working at all the former producing locations.

Major activity during the past two years, however, has been centered largely in the region known as the New Baku, lying between the Volga and the Southern Urals. The concentration of attention on this area has followed the advice and leadership of Marshal Stalin who said several years ago in addressing one of the gatherings of the Communist party, "We must seriously undertake to organize an oil base in the region of the southern and western Urals."

Exploration in this area brought sensational results and led to high expectations which caused it to be dubbed a "second Baku." Before the war it had become an important factor in Soviet oil production but about 1940 the output of the wells began to fall off, raising questions as to whether further expenditures on drilling were justified. New surveys directed by geologists of the Bashkir combine led to the discovery of rich deposits at Kinzibulatovo which today produce one-third of all Bashkir oil. Now that the area is definitely outlined plans have been made for doubling the output. Each new well brought in yields 600 to 700 barrels per day. A powerful compressor plant is now building to inject gas into the producing horizons and this is expected to bring about a marked increase in the flow of oil.

A significant development has been the discovery of oil in the Devonian in this same area. Formerly it was held that oil was to be found mainly in coal-bearing and limestone strata but last year the Tuymazneft trust decided to explore lower formations. The first well drilled yielded between 550 and 600 barrels per day. E. E. Karyagin, assistant commissar of the oil industry, commenting on this development, said: "This discovery puts a different perspective on the oil potentialities of the whole Volga-Ural region. If we find oil in the Devonian at Tuymazin then obviously we may expect to find it in the Molotov, Kuibyshev and other areas in this general region. In fact, drilling to this formation at Zolny Ovrag in the Zhigulev mountain district brought production of 1200 to 1400 barrels per day. The chief importance of the new discovery is that we may look with confidence to multiple-zone production throughout this district between the Volga and the Urals which, of course, raises its value from an economic point of view".

In 1942 oil was discovered in the Shugurevo region of the Tatar Republic. Geological work is still going on in this area but it has been decided to defer exploitation until the whole field is better defined so that development can be carried on rapidly and economically.

As a result of these various discoveries the Tuymanzneft trust has been able to increase its output more than one and a half times; production in the Stavropol fields has been doubled as compared with the pre-war figure according to locally available information; the average daily yield in the whole Bashkir Republic was 25 per cent larger in 1944 than in the year preceding, and in Kuibyshev province a five fold increase has taken place since 1941.

Although the new Baku has held the limelight in recent developments important additions to production have been made at a number of other points. New deposits located near Andijan and elsewhere in Central Asia have increased output 150 percent. An oil strike has been made inside the town of Makhach Kala on the shore of the Caspian. One derrick stands right on the main street and others rise among the vineyards and farmlands nearby. The first well in this field was drilled in 1942 and a second was brought in in October 1943, both with yields of several hundred barrels daily. By the middle of this year four wells will have been completed. Other areas being prospected nearby are known as Ulubyev, Utymash, Khoshmenziv and Guglak.

In the forward march of production the country's oldest and richest field at Baku has not remained at a standstill. New areas have been opened up in Buzovnin and Mashtagin. The latter is not unknown in Soviet oil history as exploration began there ten years ago but did not give positive results. Two years ago geologists returned with more modern methods of exploration and found convincing evidence of the presence of oil. Well 1821 drilled last summer was completed as a gas producer. Since then another well has been drilled to below 6000 ft., a third is now drilling and a fourth will be begun soon.

Along with the extension of old fields and the finding of new ones Soviet oil authorities are reviewing the operation and productivity of older wells. At the same time they are conducting a campaign against inefficient work in the industry. Recently the Peoples Commissar in Baibakov wrote to Izvestia criticizing the poor organization of development work in certain areas, the low rate of drilling speed, lost time due to frequent shutdowns, excessive breakages of tools and unnecessary accidents.

To some extent these shortcomings may be attributed to the scarcity of tools and machinery, the inadequate supply of drilling rigs leading to the use of obsolete equipment and to delays in the delivery of materials and special appliances such as instruments. Extensive orders for equipment have been placed in the United States and some have been delivered. As soon as deliveries can be enlarged a concerted effort will be made to step up the efficiency of industry operations.

The special attention that is being directed to the increase of oil production reflects the determination of Soviet authorities to launch a vast work of agricultural and industrial development as soon as the war ends and to utilize mechanical means to replace in part their heavy loss of man power during the war years. This movement, in fact, is already underway not only in oil but in other basic industries. As an aid to industrialization a vast network of pipe lines is to be constructed to supply natural gas from the fields to Moscow, Kiev and other manufacturing cities. Undiscouraged by the terrible casualties and vast damage of the past four years Russians look to a new and greater utilization of their oil resources and are preparing to move forward rapidly to its realization.

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CONGRESSIONAL ACTION NEEDED TO CLARIFY

Situation Created by FHE Decision

By Leslie Moses *Secretary and Counsel, Fohs Oil Company*

WHEREVER oil men gathered in the past few weeks conversation immediately turned to the decision of the United States Circuit Court of Appeals for the Fifth Circuit in the F.H.E. Oil Company case handed down March 6, 1945 at New Orleans. Few events have raised such spontaneous protest from the industry. No event has caused such widespread discussion since the enactment of the first wartime regulations of the industry.

Without exception it is one of the most serious blows ever delivered in the industry's history. The case arose in the Tax Court of the United States and involved the so-called "acquisition" well rule, under which an oil operator, prior to 1943, could not deduct his drilling costs on a well if the drilling of the well constituted all or a part of the consideration for the acquisition of the lease. Instead such costs were required to be treated as lease costs and recovered through depletion allowance, or charged off when the lease was found worthless, abandoned, or otherwise disposed of. In the F.H.E. case the company acquired leases, many providing that they would terminate unless drilling was commenced within a relatively short period of time. Drilling could not be deferred by the payment of delay rentals and in one of the leases the company obligated itself to drill a well. The position of the Commissioner was that none of the costs of drilling could be deducted for income tax purposes because the drilling of the well was the consideration for the lease. In arriving at a decision in favor of the Commissioner in the Tax Court four judges dissented. The opinion of the Circuit Court on the pertinent questions involved would give no cause for alarm. It was the *obiter dictum* of Judge Sibley that caused such repercussion. Briefly stated, he said: "The regulations under which taxpayers are given an option to either expense or capitalize drilling costs are invalid and, therefore, the cost of drilling a productive well cannot be expensed under any circumstances, but must be capitalized and recovered over a period of years through depletion". The opinion indicated that although the Commissioner of Internal Revenue had been allowing such deductions for a period in excess of twenty years, he was not only unauthorized to do so but was expressly prohibited by statute. It is understood that the attorneys for the Commissioner did not raise the issue of the invalidity of the regulations. Judge Waller concurred in the result of the case, but did not concur on the broad ground on which the question was decided. The decision of Judge Sibley follows somewhat his reasoning in the case of Hunt v. Commissioner (135 F (2nd) 697) decided in May, 1943, wherein he stated that the statutes did not seem to authorize the option which the regulations provided.

A rehearing has been applied for, and an extension of time within which to file briefs was granted. Top legal talent of the oil industry is hard at work in the preparation of a brief as *amici curiae*. All angles of the opinion, the relief possibilities and probable impact on the industry are being discussed, as well as plans for rectifying the potential damage. Arguments will refer to points which attorneys feel the court overlooked in reaching the decision. It will no doubt be shown on reargument that the facts in the F.H.E. case constitute an isolated issue and do not necessarily represent usual conditions in the industry. The facts in this case suggest that here again a particular set of circumstances may have justified the Department's contention that the drilling costs should have been capitalized instead of expensed. However, it is evident that the court went beyond the particular facts presented to it, as well as beyond the contention of the attorneys for the Department, by declaring the regulations invalid and without support of the statute.

The question as to whether the Supreme Court will consider the case on its merits naturally arises if a rehearing is denied. The rule seems to be that if there are conflicting decisions between different Circuit Courts, it will do so.

In this instance it is believed that the Ramsey case (Ramsey v. Commissioner, 66 F (2nd) 316) is in direct conflict with the F.H.E. decision, and that the Supreme Court will recognize that fact and hear the case on its merits. While the Ramsey case involved regulations covering "discovery depletion" allowances under the Revenue Act of 1926, the Supreme Court, in U.S. v. Dakota-Montana Oil Company (288 U.S. 459) stated that the percentage depletion provisions of the regulations were intended to cover the same thing as the earlier "discovery depletion" provisions. Argument on rehearing will point out that the House Ways and Means Committee in 1942 recommended, and Congress enacted, the revenue act substantially unchanged so far as it applies to depreciation and depletion in the oil industry; that Congress, by refusing to change Treasury department regulations, has approved the long-established practice of considering intangible drilling costs as expense items; that by reason of Congressional approval the regulations have the force and effect of law. It is well settled that where a statute has been interpreted by regulations over a considerable period of time during which the statute has been re-enacted without any change in the provisions to which the regulations relate, Congress is considered as having approved the interpretations set out in the regulations, and, further, that by the re-enactment of the statute it intended that such statute have the meaning placed upon it by the regulations.

The history of the regulations shows that they have been in effect for more than twenty-five years. The Revenue Act has been re-enacted many times during the existence of such regulations without any change being made that would indicate legislative disapproval of the regulations. The fact is that the question was raised several times before appropriate committees of Congress, the last time in 1942, when the Senate Finance Committee and the House Ways and Means Committee heard the entire case of depletion and intangible drilling costs. The Treasury Department then sought to obtain and express prohibition as to the expensing option, and argued at length before the joint hearing. The refusal of these committees to amend the law in the manner sought by the Department is evidence enough of legislative approval of the regulation. While it is true that the statute itself has never specifically provided for such option, statutory provisions have recognized the fact that the law has been so interpreted (See Sec. 711 (f) (1) (I).

Further, in the Dakota-Montana case the government relied upon the regulations in attempting to force the taxpayer to continue its practice of expensing drilling costs instead of capitalizing them in the one instance involved. The taxpayer there contended the regulation invalid. The Supreme Court sustained the contention of the government. Is it not to be believed that the Supreme Court cannot now say that a portion of the regulations is valid, according to its prior decision, while a portion is invalid, in accordance with Judge Sibley's opinion? This tacit approval of the regulations has been given in many other cases. For instance, in the Wilshire Oil case (308 U.S. 90) the Supreme Court said that the taxpayer had to take the burdens that go with its election "along with the benefits". The fact that one must face the consequences of his election certainly presupposes the validity of the regulations which permit such election.

Needless to say, this is a matter that calls for the fullest exertion of the ability of the oil industry. Very serious consequences will follow the application of the principle laid down by the court. Such consequences will not affect merely the oil producer; they are too far-reaching for that. There is a vital public interest in the maintenance of a domestic supply of oil. While it is true that any time such a ruling was announced would be considered a "bad time", in one respect the ruling could not have come at a more inopportune moment. The government is calling on the oil industry for greater development efforts. The industry is producing an unprecedented quantity of oil for the prosecution of the war. Notwithstanding the fact that the price of crude has been held down and every effort so far to secure an in-

crease has failed the industry's reserves have been gutted to furnish the gasoline which is now propelling our armies to victory on all fronts. Current production now greatly exceeds maximum efficiency rates. The decision will have a retarding effect on the number of new wells that will be drilled, certainly during the period that present high federal tax rates continue. Thus, serious injury to the war effort may result, so it is unfortunate the ruling came when the drilling of wells is so very important. However, the very importance of continued drilling may secure for the industry more prompt and favorable legislative and judicial action.

One ray of light is the fact that the Commissioner has advised that the Bureau proposes to continue to follow the provisions of the regulations notwithstanding the F.H.E. decision. He has further stated that should the courts uphold the decision, thereby compelling a change, in no event would such a change be retroactive unless so directed by Congress. Some oil men have expressed the opinion that if made retroactive it would mean bankruptcy for many producers. Even without its retroactive application the decision means life or death to the producing industry. In the very nature of their business, oil companies must expend huge sums of money for development before they can get a return on their outlay. If they are to be disallowed the right to deduct such expenses they cannot survive. The fact that in normal, non-war times the output from wells is restricted by proration, which restriction is fully enforced, makes it even more imperative that the offset of both depletion and intangible writeoffs, as allowed by present regulations, be continued, if operators, both large and small, are to continue the drilling of new wells.

It is well recognized, therefore, that the continuation of the present ruling, without correction, judicially or legislatively, will adversely affect the oil producing industry as a whole. Major companies and independent operators are equally affected. This is a matter that calls for the fullest exertion of the ability of all producers in obtaining a correction of the new handicap that has been placed by the court on the producer of oil.

It is important that the uncertain position in which the oil producing industry has now been placed be immediately and definitely clarified. Such clarification must come speedily and must be favorable to the industry. Until this is done the situation is bound to remain confused, despite the reassuring statement of the Commissioner. Clarification can come either through the courts or through legislative action. The industry should avail itself of both means. It is preparing a brief for the court, and legislation amending the Internal Revenue Code, so as to provide specifically for the option to deduct intangible drilling costs as expense or charge them to capital account, already has been introduced in the House.

While every effort is being made to have the court decision reversed a considerable time will elapse before a final verdict is delivered. Regardless of the outcome of the application for a rehearing, the case seems headed for the Supreme Court. If a rehearing is granted it will mean months of delay for reargument and a new decision. The Supreme Court will recess in two months, so the case could not come before it until the fall term, with little likelihood that a decision would be handed down this year.

Immediate legislative action is imperative. Even if the Circuit Court of Appeals reverses itself, and holds that the question of the validity of the regulations was not at issue in the case, we are always faced with the possibility of the issue arising in another Tax Court case. There are too many dangers involved in attempting to solve the problem through administrative action. The court in this case plainly stated that there was a conflict within the Treasury Department, saying that the "legislative mind" of the department desired to maintain the option while the "administrative mind, represented by the Commissioner and his lawyers, and supported generally by the courts, wants to whittle it away". In the face of such comments how can we rely upon solving the problem in a manner satisfactory to the producing industry through "administrative action"? We must, therefore, insist upon legislative action to protect ourselves thereunder, and upon having immediate legislation enacted. It is up to Congress to act now. We cannot, dare not, wait.

ASK LEGISLATION ON DRILLING COSTS

Washington

CONGRESSIONAL legislation is to be sought to clarify the doubts raised by the decision of the United States Circuit Court of Appeals for the Fifth Circuit attacking the validity of the Treasury regulation that allows a company to capitalize or deduct as expense intangible drilling costs. That is the decision reached at a meeting of oil operators held in St. Louis on April 4 and it appears to reflect prevailing sentiment throughout the industry. The feeling is that this is the only practicable means of obtaining reasonably prompt action on the matter and avoiding the tremendous damage to the nation's economy that would result from the abandonment or slowing down of drilling activities such as already is in evidence.

At its meeting in St. Louis the informal committee agreed that the need of Congressional action is "fully recognized" and unanimously adopted the following resolution:

"Resolved, that the General Depletion Committee of the Petroleum Industry through its Co-chairmen be authorized and they are hereby authorized to study, consider and explore the possibilities for legislation by Congress clarifying and confirming the option provision of Article 23-m-16 of Regulation 111, which option has been challenged by The F. H. E. Oil Company decision of the United States Circuit Court of Appeals for the Fifth Circuit, the Committee being specifically authorized in their discretion and in their considerate judgment to sponsor and recommend legislation to Congress at such time and in such manner as to sanction effectively the option granted by Article 23-m-16".

This action puts further procedure, so far as the interests represented at the meeting are concerned, in the hands of Russell B. Brown, general counsel of the Independent Petroleum Association of America, and Judge J. C. Hunter, co-chairman of the General Depletion Committee of the Oil Industry. Just what form the proposed legislation will take and whether the industry will get behind one of the several bills now pending in Congress or frame a separate measure was left for future determination.

In the meantime, the F. H. E. Oil Company has filed with the Fifth Circuit Court a petition for a rehearing. Oil Company Counsel, representing a majority of the oil and gas producers of the United States, have backed up the petition with a brief filed as *amici curiae*. Included among the signers of the brief are the Mid-Continent Oil and Gas Association, the Independent Petroleum Association, and other oil and gas associations with members representing all such groups in the country.

One question raised by the court decision, which dropped like a bomb on the industry, was whether the abrogation of the Treasury regulation's option was to be retroactive. The regulation has existed in one form or another since 1918, and has become a part and parcel of the tax structure of the oil industry.

Former Representative Wesley E. Disney, who as a member of the House Ways and Means Committee, was for years the watchdog of depletion allowance, took the matter up with the

(*Continued on page* 100)

What's New

IN OIL INDUSTRY EQUIPMENT

Electrolytic Corrosion Retarding Units

BAROID Electrolytic Corrosion Retarding Units offer a method of applying the established principle of electrolytic protection to most installations subject to corrosion. Each Baroid unit contains a number of cells which center in themselves the destructive effect of corrosion, thus protecting the remainder of the installation. Baroid Sales Division of National Lead Co. are the distributors.

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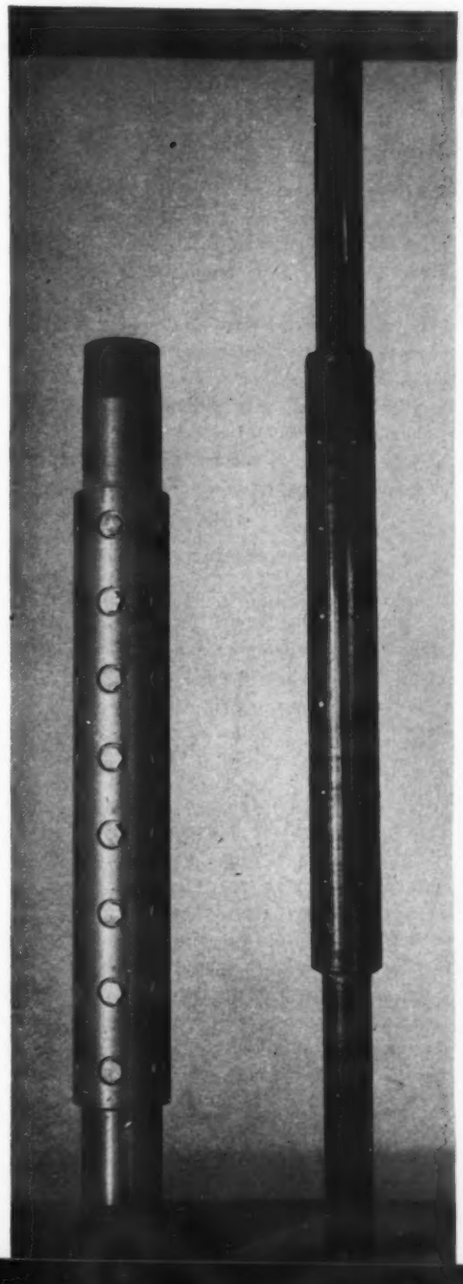
One type of Baroid electrolytic corrosion regarding unit takes the form (see illustration) of a length of pipe or a cylinder containing a group of cells. These units may be attached to the tubing in oil wells, wash tank heating coils, condenser coils, heat exchangers and all other tubular systems where electrolytic corrosion presents a problem.

Another type of retarding unit has the cells contained in a metal plate. These may be attached to the hulls of ships, tanks, or other non-tubular structures to inhibit corrosion in these installations.

One model of the tubular Baroid electrolytic corrosion regarding unit, particularly designed for oil well use, affords protection from both internal and external corrosion, the retarding cells being alternately divided between those exposed to the exterior and those exposed to the interior of the pipe. Such units have proved effective in protecting pumps, tubing, and anchors in oil well pumping installations. They also have been used successfully attached to the heating coils of oil field wash tanks and to many similar installations in which one liquid passes through pipes immersed in another liquid, either or both of which may be electrolytic corrosive. Where the corrosive electrolyte is definitely known to be either on the outside or the inside of the pipe to be protected, Baroid units are available with cells fixed in position to protect against the type encountered.



Two Standard Models of Baroid Electrolytic Corrosion Retarding Unit.

Where it is not known whether the interior or the exterior electrolyte is the most corrosive, or where both liquids are corrosive, then installation of the staggered type, in which interior and exterior cells alternate, is recommended. An examination of the latter after a period of use will reveal whether the inside or the outside liquid causes the most corrosion. Then, if desired, the cells least corroded can be unscrewed and replaced by their opposite type.

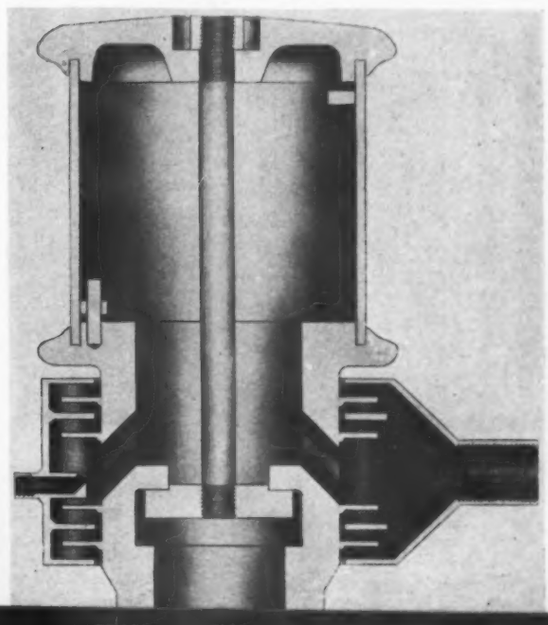
Water-Cooled Cathead

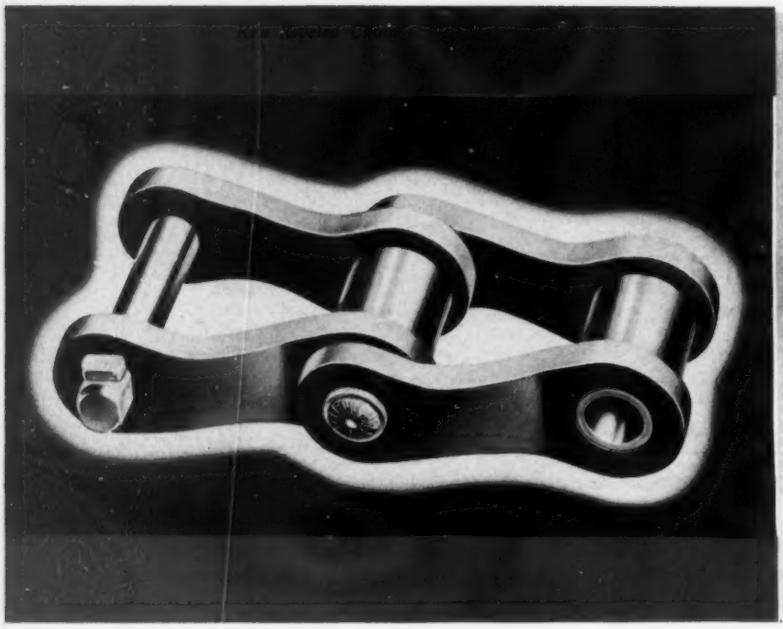
THE A-1 Dickson water-cooled cathead combines in one unit water cooling and a large drum, and eliminates packing, bearings, gaskets, etc. In this revolutionary water-cooled cathead, there is no bearing to wear out, no packing to buy, nothing to grease. It is adaptable to all types of drawworks. It is simple and operates in the conventional manner, requiring no special training of drilling crews.

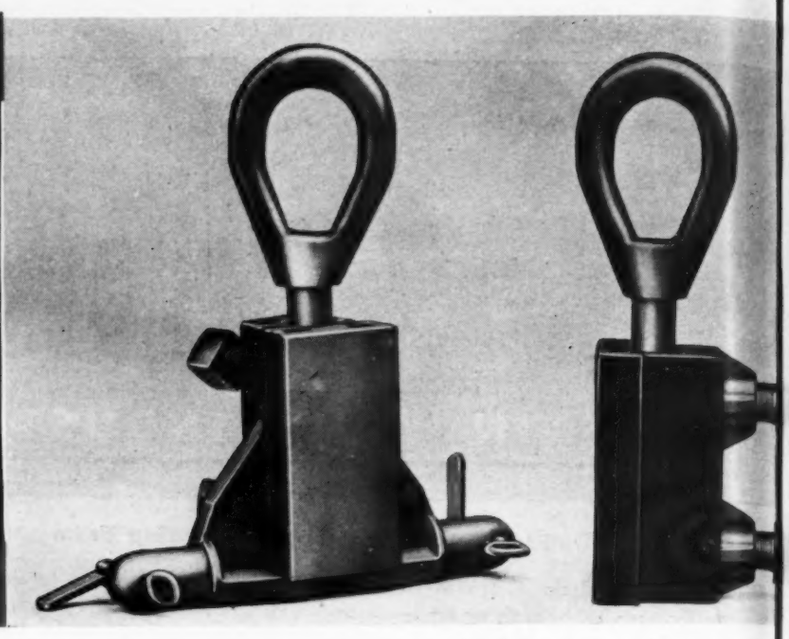
In the A-1 Dickson water-cooled cathead, the large drum requires fewer wraps of catline for a given load and allows the drawworks to run at slower speed. Slower rotating speed reduces operating hazards and saves rope.

The drum is reversible and is easily removed and replaced by unscrewing one unit. Shipping weight is 560 lbs.

A-1 Dickson Water-Cooled Cathead



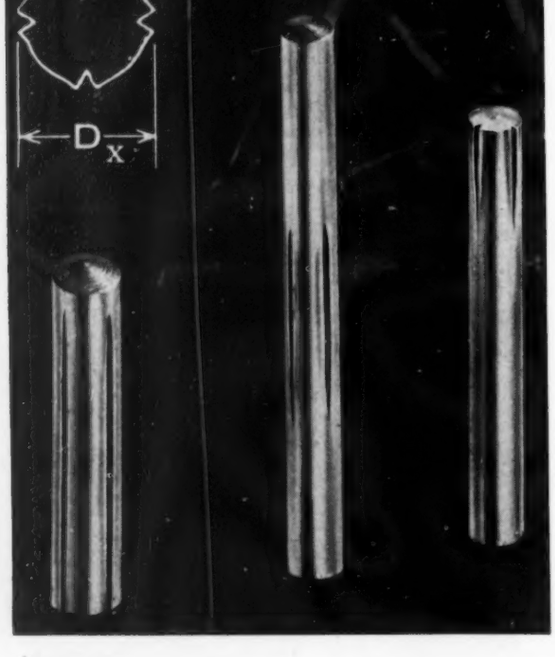




Ratigan Improved Polish Rod Grips

Rex Riveted® Chain

A washer made of soft metal makes possible a great stride forward in riveted chain construction, according to Chain Belt Company. Their new Rex Riveted Chain uses such a washer to facilitate taking the belt apart. The head of the rivet itself is actually smaller in diameter than the side bar and bushing bole. It is retained in position by the soft metal washer. To disconnect the chain, it is only necessary to shear the washer off. The rivet can then be removed easily, leaving no scars on the side bar or inner surface of the bushing. Further information can be obtained from Chain Belt Company.



Latest Improved Polish Rod Grips

THE No. 204 and No. 205 are the latest improved types of Ratigan Polish Rod Grips, and were designed to accommodate present types of unitized pumping equipment which require a short and narrow gripping device of high capacity. They are manufactured by J. P. Ratigan.

Both types consist of three parts—the body, connecting block, and gate—and are identical in capacity and mechanism except that the No. 205 is equipped with trunnions.

The No. 204 Grip is considerably shorter and narrower than its predecessor the No. 7, one of the most popular screw type grips, and weighs 11 pounds less, although it has 53,000 lbs. holding capacity as compared to 37,000 lbs., for the No. 7, and costs the same. It will accommodate most of the pumping units having carrier bars, usually supplied by the manufacturer.

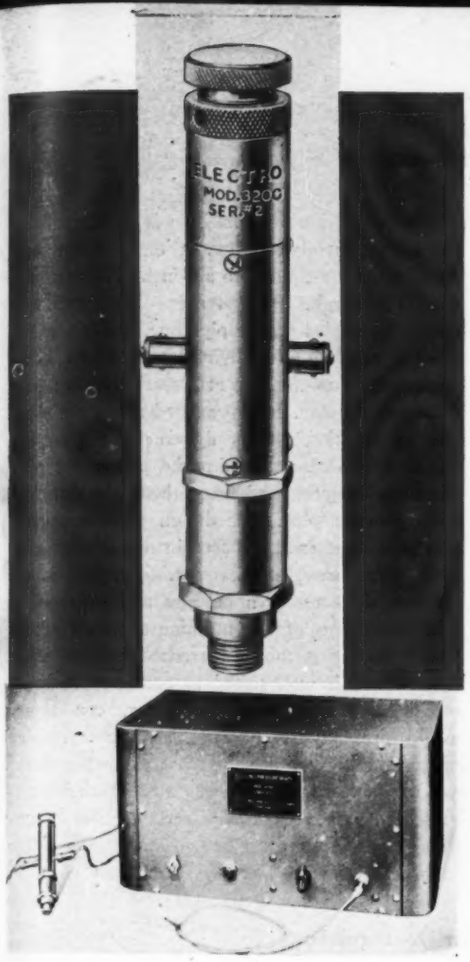
The No. 205 was designed as a combination carrier bar and grip, and will accommodate centers from 8″ to 10″. The trunnions allow more flexibility of the wire line between the trunnions and the bottom of the horsehead, and will prolong the life of the cable.

Due to the short distance between the horsehead and the stuffing box on present types of pumping units, the No. 205 grip should be used with the Ratigan No. 181 Wire Line Clamp, which is adapted to the trunnions, and is used extensively on all types of wire line horseheads. This clamp, being short, gives the operator the benefit of all the cable possible; eliminates babbitting, and keeps the lines in the center of both the grip and the polish rod.

Type	Approximate Holding Cap.	Approximate Weight	Price
No. 7 2-Screw	37,000 lbs.	30 lbs.	$25.00
No. 50 3-Screw	53,000 ″	45 ″	$35.00
No. 204 2-Screw	53,000 ″	19 ″	$25.00
No. 205 2-Screw (Trunnions)	53,000 ″	28 ″	$35.00

New Self-Locking Driv Lok Pins

THE Driv-Lok Pin Company announces a complete line of standard and special self-anchoring, vibration-proof pins, (at left) designed to replace more expensive taper pins, keys, cotter pins, set screws, rivets, etc. These pins, which are pressed or driven into standard drilled holes, have four flutes on the surface parallel to the axis. The length and position of the flute can be controlled accurately, so that fully or partially grooved pins are available. Fully grooved pins have a pilot at one end so that the pin can be easily inserted. The raised, work-hardened edges of these flutes provide an expanded diameter of a few (specified) thousandths greater than the nominal diameter of the pin. When the pin is inserted in a drilled hole, these raised edges are compressed inwardly, providing a resilient, self-locking element which, it is claimed, will hold indefinitely under vibration or shock conditions. They are available in sizes from 3/64″ to 1/2″ diameter, and from 3/16″ to 4-1/2″ in length, in any material, and in a wide variety of types.



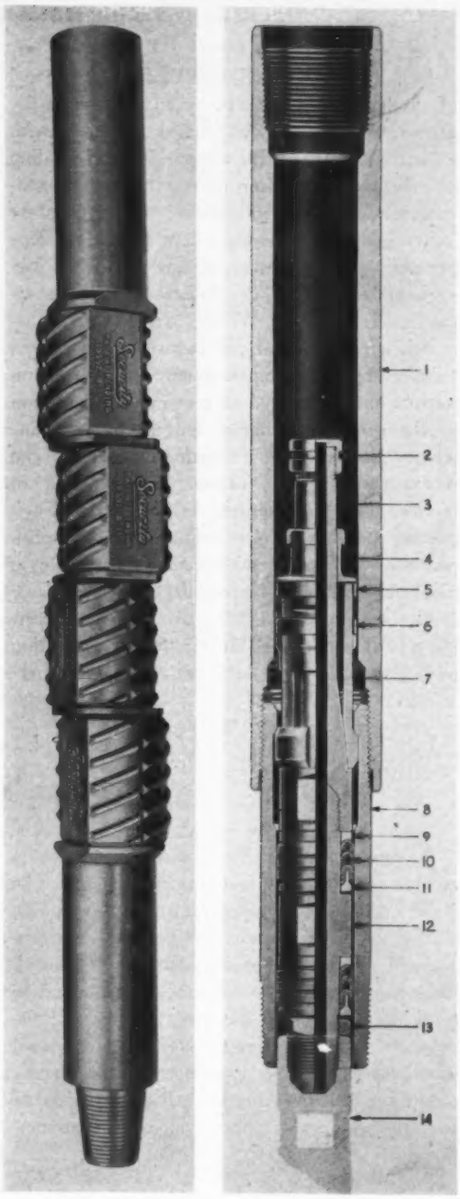
Linear Pressure-Time-Curve Indicator

ELECTRO PRODUCTS LABORATORIES, INC., announces a new product, known as the Pressuregraph, which successfully meets the long felt need of many manufacturers and engineering laboratories for a linear pressure-time-curve indicator.

It is claimed by the manufacturer that this new electronic device will indicate, in linear response on the screen of a cathode ray oscillograph, the pressure-time curve of any internal combustion engine, pump, airline, or any other enclosed pressure system where pressure measurements are desired. The pressuregraph measures either static or dynamic pressures. It is stated to have been successfully applied to 2-cycle engines to show pressure-time-curve of main cylinder or crankcase and also to have been used on C.F.R. aviation fuel test engines for measurement of pressure-time-curve.

In operation, the pickup section (see illustration) of the Pressuregraph is inserted in the cylinder, chamber or airline etc., to be pressure measured. The pickup response is transmitted, after amplification, to the screen of a cathode ray oscillograph.

Additional advantages claimed for the Pressuregraph are simplified operation, only one control being required, with one initial adjustment to compensate for temperature effects.



New Casing Scraper

Casing Scraper

SECURITY Engineering Co. announces a new casing scraper designed to fill the need for a tool that thoroughly cleans the inside of pipe whether new or old. It operates on the same slicing action principle as the Sievers Reamer; and according to the manufacturer, it only takes 200 turns to clean the dirtiest pipe and prepare it for free passage of production tools. Especially valuable for taking burrs off gun perforations, the Security Casing Scraper is also recommended for thoroughly cleaning cement, scale, corrosion, paraffin and all kinds of material from the inside walls of casings.

The design of this tool offers several distinctive features. Square mandrels with reversible scrapers greatly lengthen the tool's life and reduce operating costs.

Otis Type EB Choke

1. *Flow Coupling*
2. *Retaining Nut*
3. *Lock Mandrel*
4. *Slip Carrier*
5. *Slip Carrier Band*
6. *Mandrel Band*
7. *Slips*
8. *Landing Nipple*
9. *Male Packing Adapter Ring*
10. *Packing*
11. *Female Packing Adapter Ring*
12. *Packing Mandrel*
13. *Packing Mandrel Nut*
14. *Sub-Surface Control*

The New Otis Type EB Choke

THE new Otis Type EB choke represents the latest design in subsurface pressure control and provides an easily removable, yet a most positive, lock and packoff assembly for subsurface tubing regulators, chokes, plugs, safety valves, etc. The original purpose of the tool was primarily to withstand extremely high subsurface temperatures and pressures; however, the fact that it is simple to run and pull, plus additional features, makes it most desirable for any removable subsurface control installation. This tool, like all other Otis subsurface tools, is run and pulled under pressure on an ordinary steel meauring line.

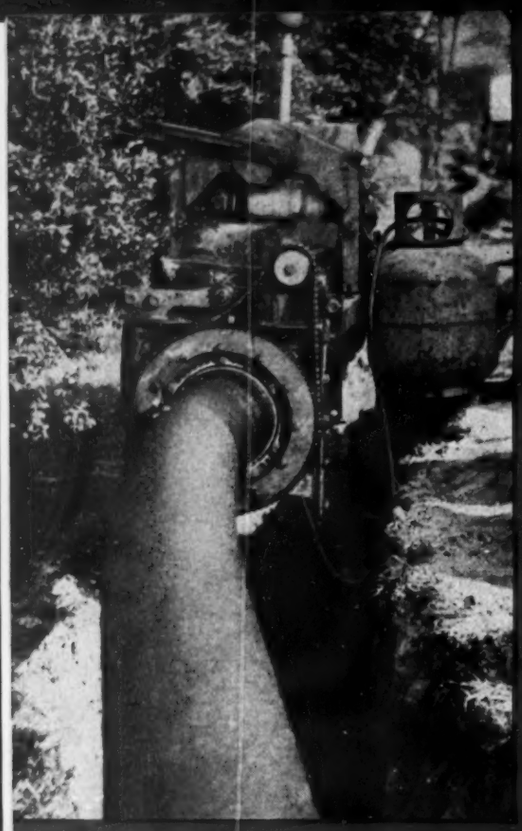
The principal advantages of the EB choke are as follows:

1. **Heat Resistant Packing Element** — The slightly restricted landing nipple makes possible the use of the new asbestos-base heat resistant packing now used so successfully on the Otis side door choke. This packing easily withstands the highest subsurface temperatures and pressures and is inert to acids, alkalis and sour crudes.

2. **Unnecessary to Flow Well to Set Packing** —The packing fits snugly in the restricted nipple; therefore, it is not necessary to flow the well hard to cause the initial shutoff. This is particularly important where there is danger of pulling sand into the tubing string by flowing the well at an excessive rate.

3. **Simple to Run and Pull** — Because the O.D. of the Type EB choke is smaller than the regular type B, the new tool is easier to run and pull through crooked tubing, paraffin deposition, etc. The setting and pulling operation is simpler and the present packing always assures a positive shutoff regardless of the pressures encountered.

4. **Flow Coupling:** A special flow coupling, much heavier and longer than standard couplings, is now used immediately above the landing nipple to reduce the possibility of abrasive flow cutting through the tubing.

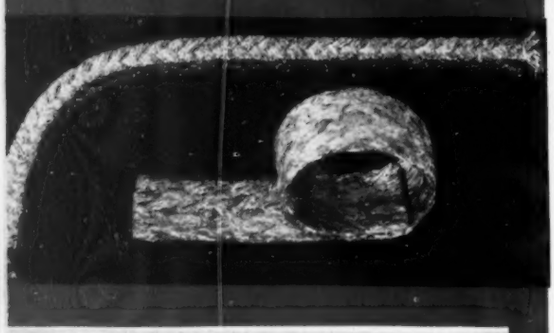


Somastic Pipe Coater at Work

Machine for Application of Somastic Pipe Coating

SOMASTIC PIPE COATING, composed of asphalt of prescribed properties carefully blended under rigidly controlled conditions with a mineral aggregate, the composition and grading of which is fixed within narrow limits for maximum resistance to soil stress and to moisture infiltration, has heretofore been applied to pipe for new construction at central plants, at jobsites, and for pipe lines in service in an over-the-trench operation. While extensive over-the-trench applications of the coating are not new, certain important improvements of plant components have permitted an economical adaptation of the process to shorter lengths of pipe line where assured pipe protection is needed and where the pipe line cannot be taken out of service. This development by Industrial Engineering Co. has been accomplished by simplification of equipment with moderate sacrifice in speed of operation. The rotating extrusion nozzle applies the dense, seamless coating to the operating pipe line with the highest quality in coating with respect both to composition and to workmanship.

The simplicity of the machine is illustrated in the accompanying photograph of a recent application of the coating to a 6-inch products line near Pittsburgh, Pennsylvania. The machine, readily assembled on the pipe line in thirty minutes, is capable of applying the one-half inch thick coating to the pipe at a speed approaching 2000 feet per day. It is propelled along the pipe line by traction wheels driven by a gasoline engine which also provides the power for the nozzle to compress and firmly bond the durable coating to the pipe. The design permits operation on a short radius as seen in the photograph, so that the dense, seamless coating applied is of uniform thickness even on sags and overbends. The dimensions of the machine are such as to permit its use within the trench itself so that the machine is well suited to operation in congested areas where right-of-way conditions would prohibit the use of the larger mobile equipment required for the more extensive over-the-trench operations hithertofore carried out. Present designs contemplate the pipe size range from 4 to 12-inch.



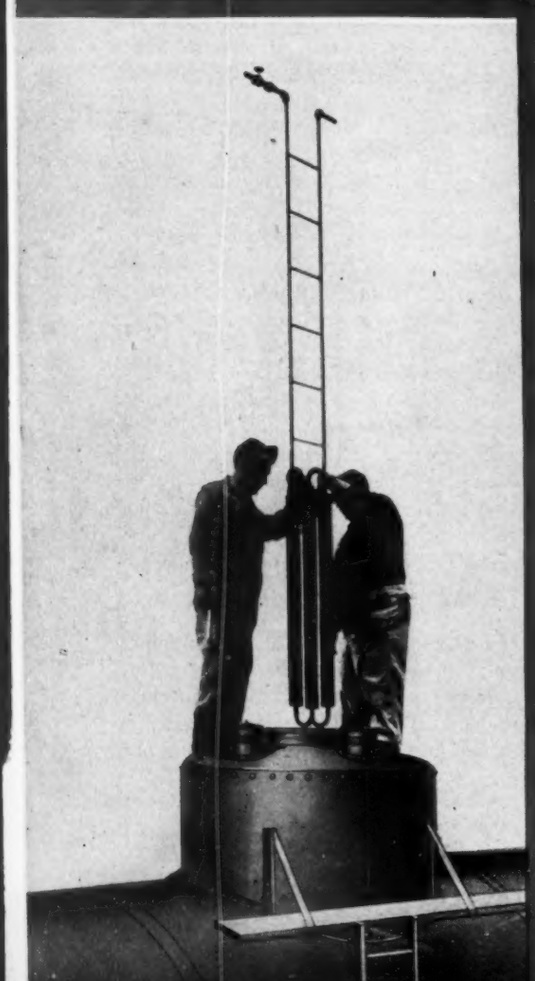
New Flexible Metallic Packing

A new type of flexible metallic packing capable of withstanding temperatures up to 2000°F. and highly resistant to corrosive gases, alkalies, and most acids, has recently been announced by Johns-Manville. Known as Inconel, and of a construction and toughness adapted to many industrial uses, this new packing owes its existence to the need for a material which would stand up under the exacting and destructive conditions existing in the exhaust systems of airplane engines equipped with turbosuperchargers.

In this service, flexible connections are necessary to absorb vibration between stationary and moving parts of the exhaust system. At the same time, these connections must prevent leakage of the exhaust gases which have a greater tendency to seepage with the possibility of injuring equipment or contaminating the cabin air supply.

No existing material was adequate to meet these unusual conditions until J-M engineers produced Inconel Packing. Made of a nickel-chromium-iron alloy in wire form, which is first knitted into mesh and then braided, the finished product has proved ideally suited to the service for which it was intended. In addition to its high corrosion and temperature resistance, the new packing is strong, resilient, and both non-scaling and non-magnetic. It is available in a number of styles, including square section packing in coil and tape forms, from which ring type gaskets may be formed. One style is made with asbestos fibres interwoven with the metallic alloy and serving as an annealing agent.

It is expected that this new packing will find a multitude of applications where exceptional heat resistance and the ability to withstand corrosion are important considerations.

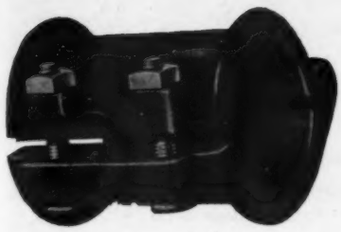


Immersion Type Steam Tank Heater

NEWLY introduced by The Brown Fintube Company, manufacturers of resistance welded, integrally bonded fintubes and fintube heat transfer products—this immersion type steam tank heater is used with any material, the viscosity of which can be lowered by heating. The heaters speed up the emptying of tank cars and permit many viscous materials to be handled in cars not fitted with steam coils.

As illustrated herewith, the heater consists of a number of lengths of Brown Fintubes connected in series, and inlet and outlet steam lines. The heaters have low center of gravity. They can be handled safely by one man, or very easily by two men. Cross handles aid in positioning the heater over the discharge outlet in the car, in blocking the heater at various depths, and removing the unit after the car is empty. Furnished in two sizes—the No. 642 for use with tank cars—the No. 442 for use with tank trucks.

Fintube Steam Tank Heater.



Emergency Pipe Clamp

THE M. B. Skinner Company offers its emergency pipe clamp which is especially appropos in these days of pipe shortage. Its function is to repair pit holes, splits and corrosion leaks in both steel and cast iron pipe lines. The repair is permanent, the pipe stronger than ever.

The Emergency Pipe Clamp offers a triple economy. It saves the cost of the new pipe—the job of tearing out the old pipe and putting in the new—the expense of shutting down while the work is being done, often thousands of dollars.

Its no trouble to put on an Emergency Pipe Clamp. Owing to the long open hinge, the two halves of the clamp may be slid together along the pipe, when crowded for room—as in coils. The clamp is usually put on under pressure—without interruption of service. Bolts can be inserted from either side—gasket can be used either under top half or bottom half so that clamp can be installed easily under the most awkward conditions.

It is made of malleable iron, strongly proportioned, and fitted with sturdy, electro-plated high tensile steel bolts. Note the raised lugs for wrench convenience.

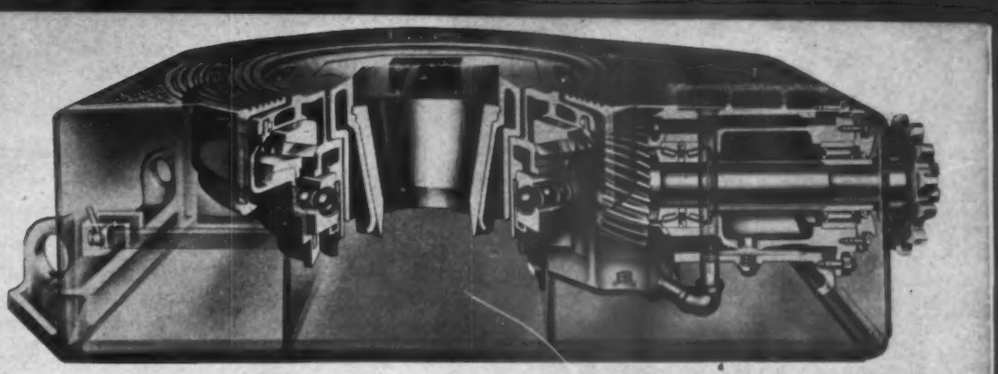
All clamps are enameled to resist rust, equipped with special pressure-equalizing gasket, molded to each individual pipe size. For long splits in pipe, or very hard corrosion resulting in a series of pit holes, there is nothing like the Skinner-Seal Pipe Line Clamp. Same design and construction as the Emergency Pipe Clamp except that it is about double the length.

Air Cooled Heat Exchangers

THE new Alco (American Locomotive Company) Air Cooled Heat Exchanger uses air as the cooling medium, is unaffected by high humidity and can be erected over existing structures. (See illustration).

The up draft design for air flow over the heat transfer surface obviates the uncertainties of changing winds. A motor driven fan located on the top deck provides positive predetermined air flow in a direction remote from the air inlet. The fan, motor and mechanical drives are readily accessible for inspection, lubrication and servicing.

The induced draft operation assures uniform air distribution over the heat transfer surface, while the vertical air flow permits constant cooling or condensing regardless of wind velocity or direction. There is no recycling of hot air.



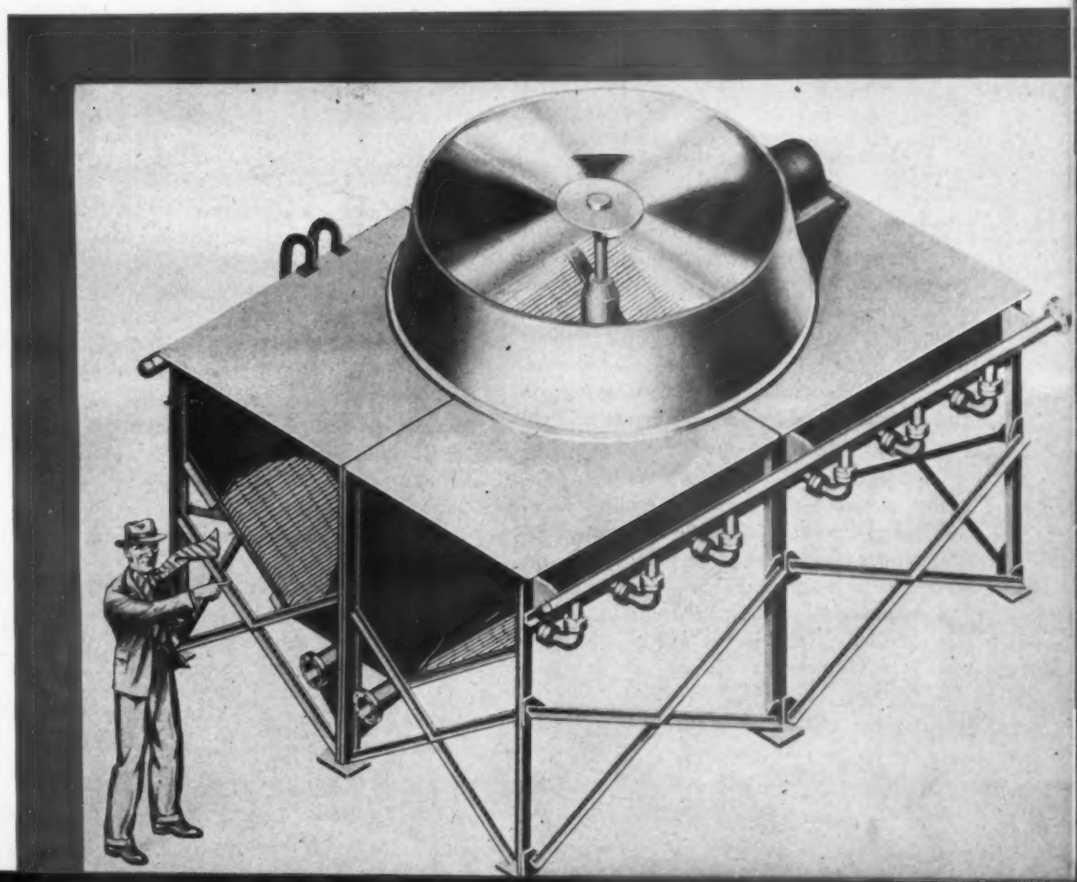
Ideco Streamlined Rotary

THE Ideco Streamlined Rotary is a development by the International Derrick & Equipment Company—one of the Dresser Industries.

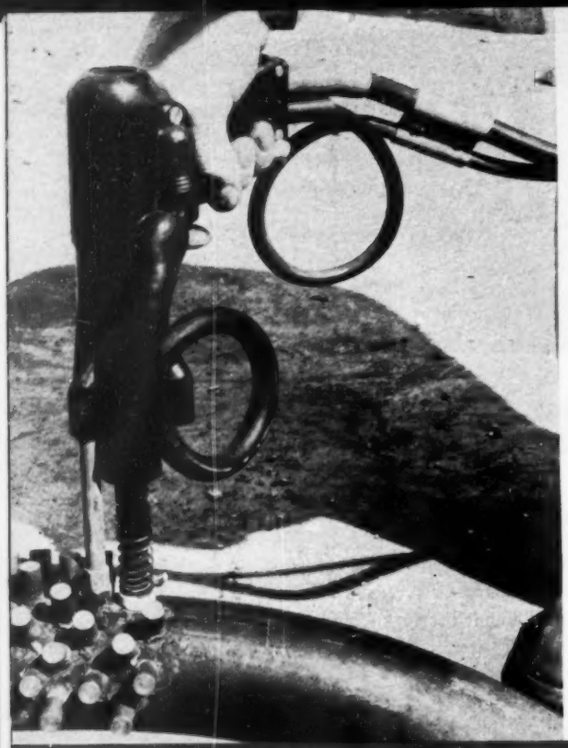
Built in four standard sizes, this streamlined rotary is precision engineered for smooth, high-speed drilling. Spiral cut shock-resistant teeth are generated on modern precision machines, and all gears are "run in" at the factory. Main bearings are 3" ground and hardened steel balls mounted in specially heat-treated steel races, and are evenly spaced with a bronze retainer. Pinion thrust is absorbed by a self-aligning double-tapered roller bearing, and the sprocket end of the pinion shaft is also mounted in anti-friction bearings. Hold-down bearings are two-piece rings which completely encircle the gear table, and are adjustable for wear.

Important for quiet, high-speed operation and reliable, trouble-free service is the exclusive Ideco 100% oil bath. All working parts are continuously lubricated with a single oil bath system, and almost a gallon of oil per minute flows through the pinion bearings. The 100% bath is easy to service, as the reservoir is filled and gaged at a point, located on top of the table. An auxiliary safety reservoir retains oil to lubricate pinion bearings should oil in the main reservoir ever fall below the proper operating level. Grit and foreign matter is eliminated from the oil flow by a sump from which such harmful material may easily be removed.

Derrick floors are easily fitted to the smooth, box-shaped unit. Double the normal standing surface around the hole safeguard the crew against stumbling and slipping accidents. The Ideco patented locking device contributes heavily to safe and easy operation. The locking bar engages any one of the multiple notches in the table skirt, permitting simple and positive engagement while avoiding the usual high stresses in pinion shaft, gears and bearings. The pinion shaft assembly is a one-piece capsule which may be removed quickly as a unit, for replacement or repair. A tapered fit between the sprocket and pinion shaft facilitates the removal of the sprocket while assuring a tight operating fit. The sprocket is held in place by a safety nut. The accompanying cut-away drawing shows the 100% oiling system.



Alco Air Cooled Heat Exchanger



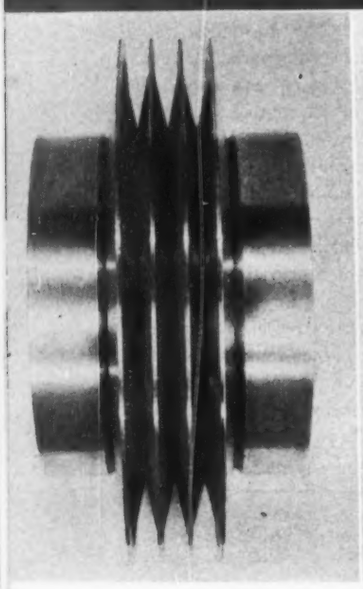
End-Welding Studs With Stud Welder.

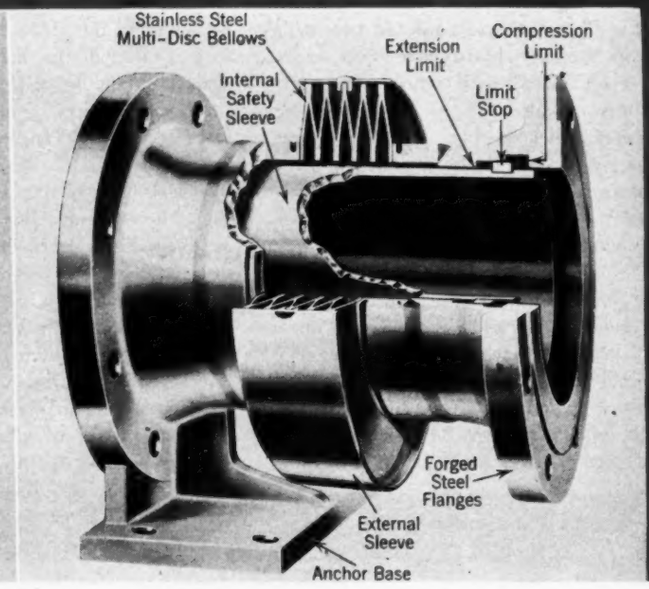
Newest Developments in Stud Welders

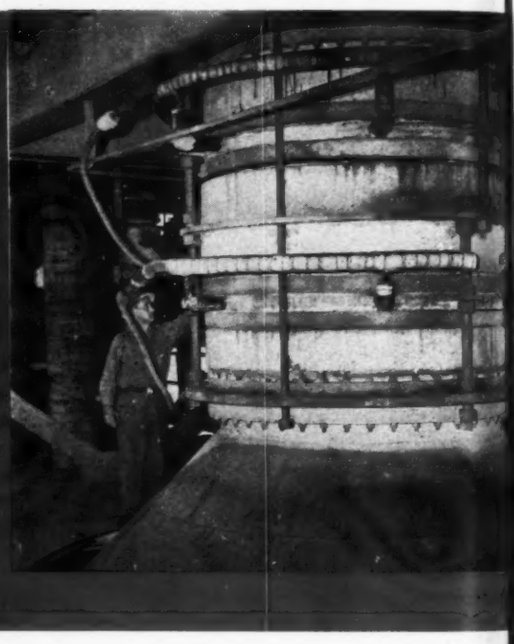
IN modern industry there has been a tremendous need for a portable tool to end-weld steel studs to metal surfaces. Many attempts have been made to lick this problem, but it took the inventive mind of a leaderman welder to create the Nelson Electric Stud Welder.

Flexible in its uses and applicable to many types of industry the Nelson Electric Arc Stud Welder is extremely simple to operate. As the welding process is entirely automatic new operators can be trained quickly . . . it welds a stud in less than one-half of a second and new workers can complete from 500 to 1000 welds in an 8 hour shift.

The operating principle of the stud welder is to create and control an arc between the stud and the steel surface to which it is to be welded. The operator loads the gun and places it in the proper welding position with the stud end and the spacer legs pressed firmly against the plate. From the moment the trigger is pulled the entire weld cycle is automatic. The welding current is turned on and the stud is lifted to create an arc which burns a predetermined length of time. The lift of the stud is accomplished by a spring mechanism in the gun, which is set in action when the trigger is pulled. The number of cycles the arc is allowed to burn is controlled by a pneumatic timing device built into the control unit. When the arc is completed the timing device trips the gun, plunging the end of the stud into molten metal. This completes the welding operation. The gun is now removed from the stud and reloaded for the next weld.







Bellows Expansion Joints

THE above picture shows the basic feature of the Foster Wheeler Expansion joint . . . a positive bellows construction which can expand and contract in all directions. Made of stainless steel, it is fabricated by a patented welding process which joins the individual sections together into an expansion joint possessing strength and flexibility to a degree never before achieved in this type of metallic connection.

Center picture is an internal cut-away view of the finished expansion joint; the bellows, welded in position; the internal sleeve, limiting the movement to design specifications and the general construction are shown in this drawing. This particular joint is but one of the many possible applications of the bellows principle.

In a large Fluid Catalytic Cracking unit, (right) this 72 inch Foster Wheeler Type "S" bellows expansion joint has a lateral design movement of 2.86 inches and a linear design movement of 1.6 inches, compensating for the expansion resulting from an operating temperature of 1075°F.

The two insulated pipes which circle the joint supply inert gas to the bellows at higher pressure than the catalyst stream, thus preventing accumulation of catalyst dust in the bellows elements and insuring proper joint movement.

Pumping Problems Solved

IN an effort to assist engineers and servicemen concerned with the operation, purchase or sale of pumps in the marine, manufacturing, petroleum and process industries, the Geo. D. Roper Corporation, have published a new book entitled "How to Solve Pumping Problems."

The book is designed to aid the beginner as well as the experienced pump engineer. It outlines, step by step, the basic fundamentals used in estimating the requirements of the average pumping job. By simple language and the example method, it explains the formula used in figuring section lift and discharge head. It gives information on how to estimate horsepower requirements, and the size and speed of pulleys. Technical charts and tables show friction loss in pipes, viscosity conversion, wiring data and fuse sizes. Helpful hints for installing pumps and tips on trouble-shooting are also included.

The new Roper book, which is devoid of advertising, can be obtained free from the Geo. D. Roper Corporation.

Quickly Mounted Service Mast

THE Lee C. Moore Truck-Mounted Mast is complete with rod hanger bracket and platform and tubing platform, thus providing the utmost convenience for hanging rods and stacking tubing.

It is raised from the transporting position to the operating position almost automatically. One small friction clutch is engaged for raising or lowering, which is automatically disengaged when the operation of raising or lowering is complete. The power for this operation can be taken off the truck transmission or the hoist counter-shaft.

Two roller chain drives draw the bottom end of the mast out and inter-connecting links simultaneously force the upper portion of the mast up. These links serve to complete a rigid structure when the mast is in the erect position thus eliminating any necessity for guy lines since the rigid structure will resist all horizontal and torsional loads caused by hanging the rods and stacking the tubing.

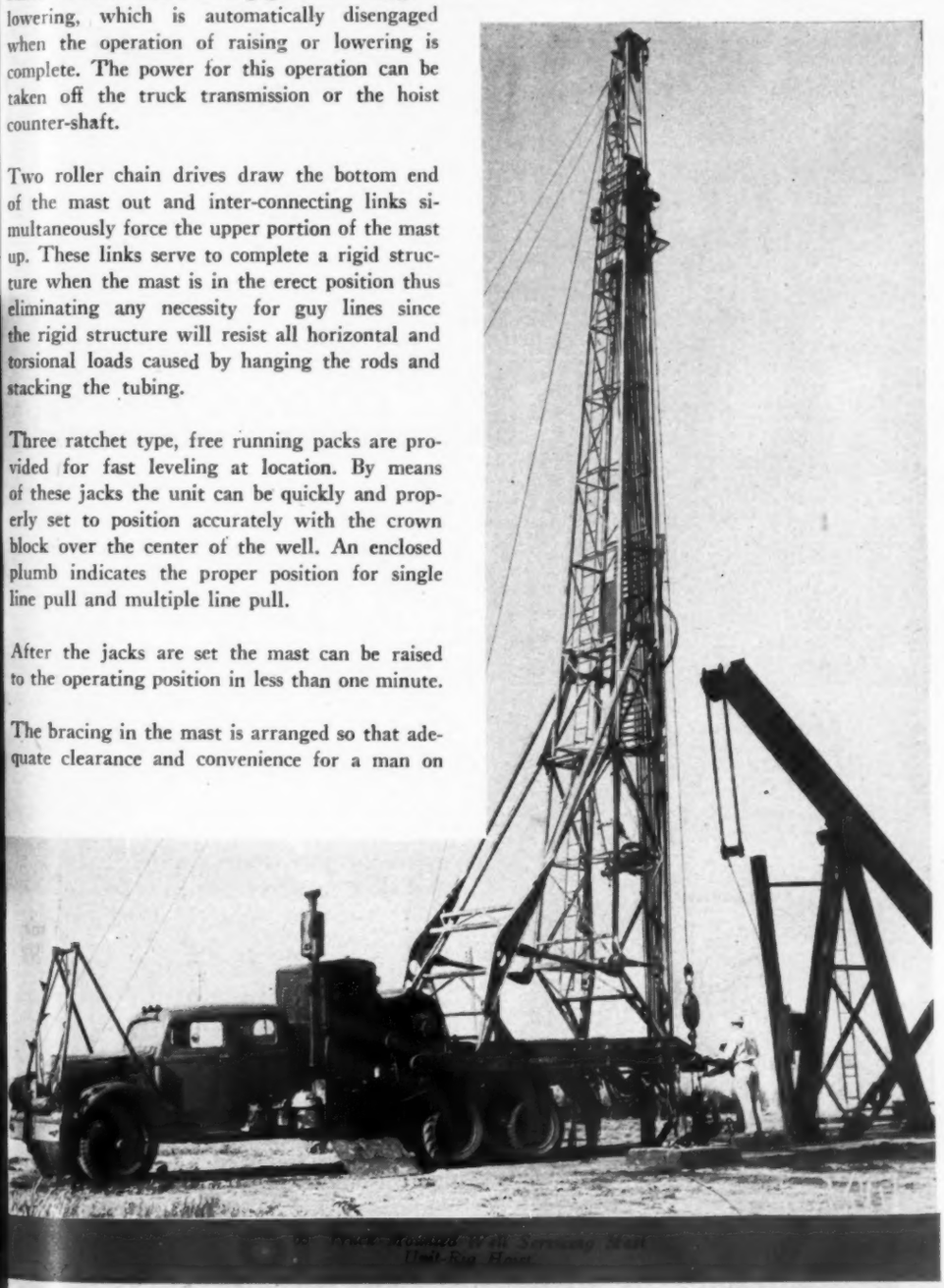
Three ratchet type, free running packs are provided for fast leveling at location. By means of these jacks the unit can be quickly and properly set to position accurately with the crown block over the center of the well. An enclosed plumb indicates the proper position for single line pull and multiple line pull.

After the jacks are set the mast can be raised to the operating position in less than one minute.

The bracing in the mast is arranged so that adequate clearance and convenience for a man on the rod platform or the tubing platform is provided.

All pivot points in the mast raising linkage are equipped with roller bearings so that long life in the linkage is assured.

Alloy steel tubular construction insures minimum weight and maximum strength.



Truck-Mounted Well Servicing Mast Unit For Hire

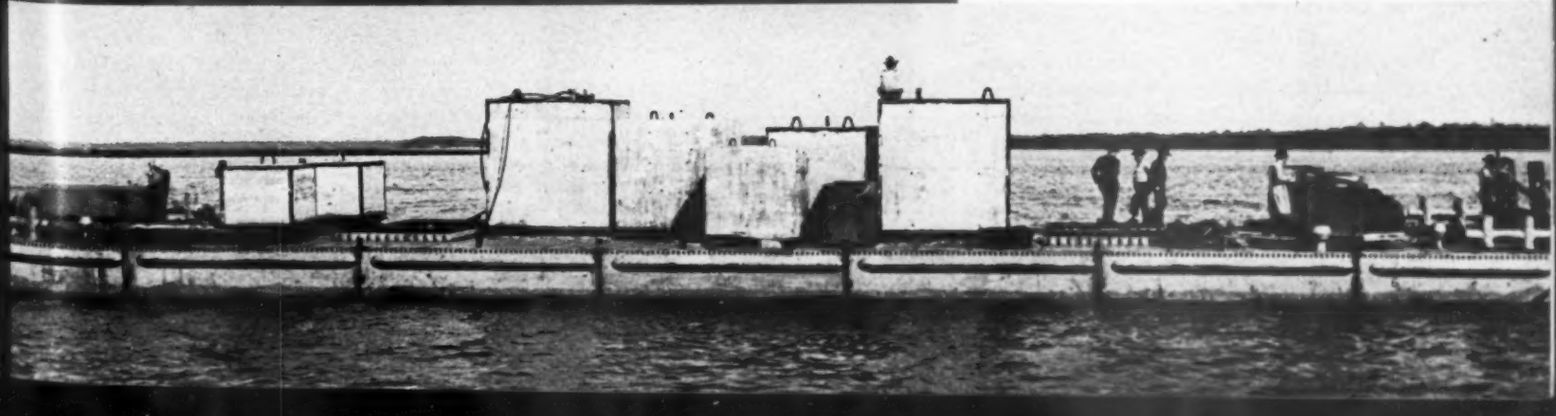
Knock-Down Combination Oil-Cargo Barges

A late development of the American Steel Dredge Company is a new shallow-draft barge which draws only 24 to 36 inches of water with a normal load. One unit currently in use by the Allied Armies is 104 ft. long by 29 ft. wide by 8 ft. and carries approximately 300 tons of liquid as hold cargo. A deck cargo in addition to the liquid carried in the hold is entirely practical, although in the present units the total gross tonnage cannot exceed 350 tons.

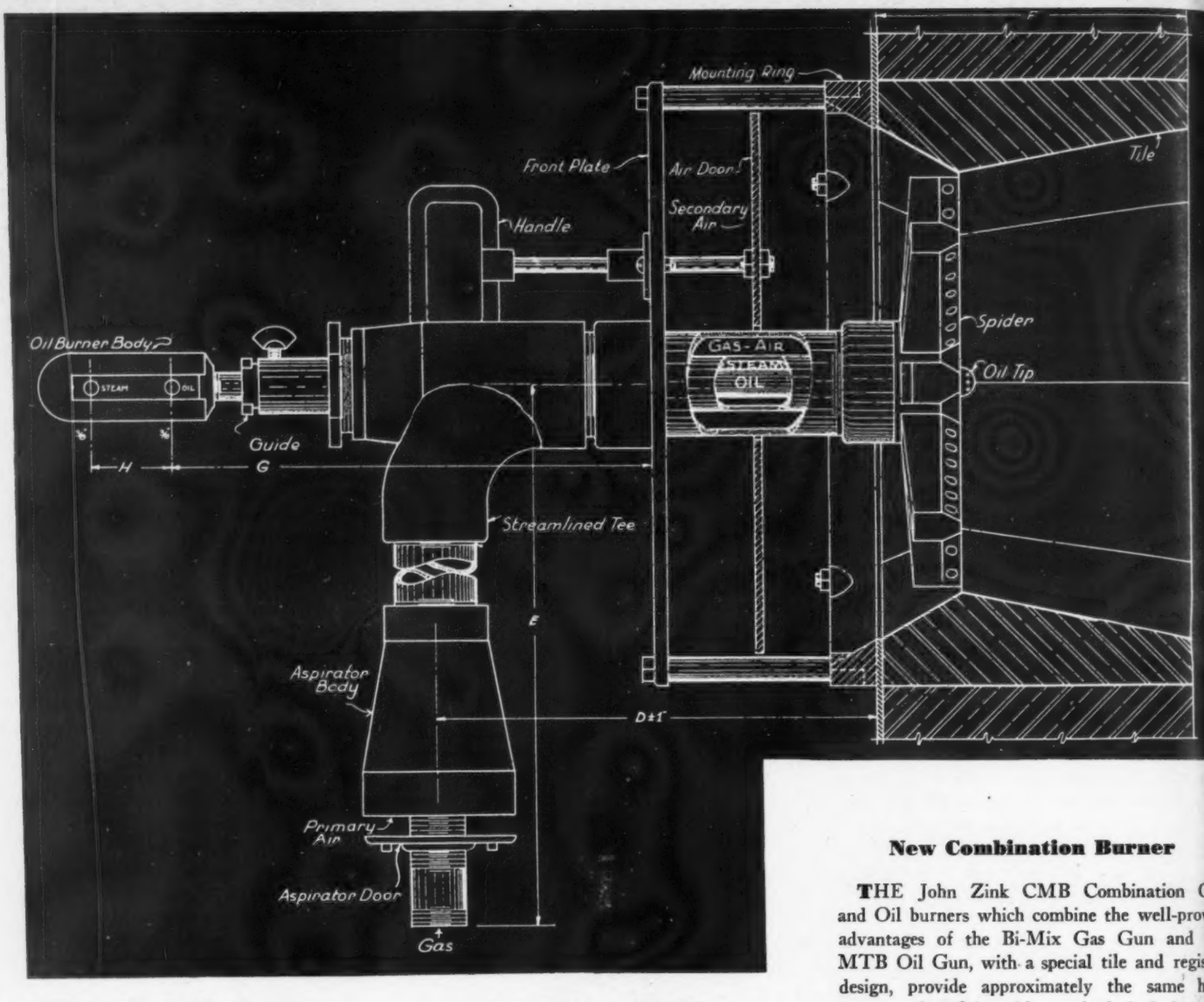
Because of the pre-fabricated steel panels and sections that make up these barges, it is convenient to ship them overseas as hold cargo. If further transportation to the site of its intended use is required, the barge, still in sections, can be loaded on railroad cars or trucks and taken to the point of use. It is erected by simply bolting the panels together and, in the case of units for liquid cargo, welding in a sub-bottom of light steel sheet.

Depending upon where the barge is to be used, it is available in two designs. One provides a normal rake on the bow and stern, and the other, intended for extremely shallow water and for narrow channels, has raked sides in addition to the bow and stern rake. These barges can be made into self-propelled units by the installation of heavy duty outboard motors. Many of the barges are now in operation with this outboard propulsion, either gasoline or Diesel, to transport cargoes on inland waterways.

In unloading the gasoline or oil from the hold no stripping is necessary, due to a unique method devised whereby virtually every drop of the cargo is secured in the initial operation. A watertight compartment is built in the port-bow corner of the barge. A seacock controlled from the deck opens directly into this compartment. Just before the unloading starts, the seacock is opened and the compartment is filled with water to the loaded water line level. This ballast lowers the corner of the barge so that as the unloading operation proceeds the cargo drains to the "low corner" and the last gallon can be pumped from the hold. After unloading, the seacock is opened again and the ballast water released. The few gallons of water remaining below the light water line can be removed with a hand-operated bilge pump or bailed out with a bucket.



Sectioned Combination Cargo-Oil Barge Undergoing Test.



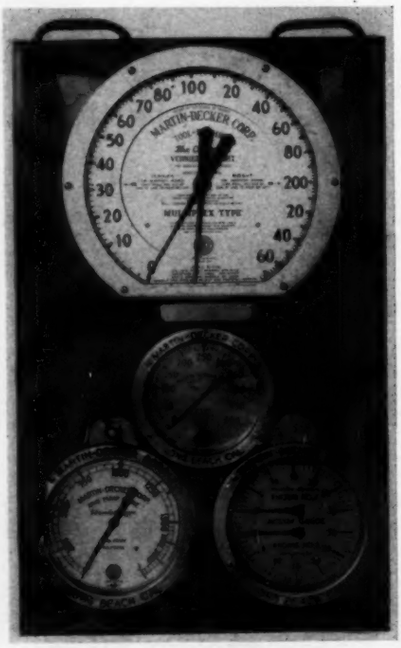
Sectional Diagram of John Zink Combination Burner.

Drilling Control Instrument

MARTIN-DECKER announces a Clipper Sealtite outfit of instruments which provides complete drilling control for the mast or portable derrick and power rigs, but has the capacity for any depth. The Clipper Sealtite is assembled in a steel case (see illustration) which can be furnished with any combination of the following instruments: Weight indicator with Vernier and single pen 8½" weight indicator recorder, mud pump gauge, double vacuum gauge and rotary table tachometer. Storage facilities for the Sealtite equipment, weight diaphragm, mud diaphragm, hose, etc., are provided in the steel case. Other combinations include mud pump gauge and torque gauge for steam rigs. These instruments may be mounted with a short connection of high pressure sealtite hose, at or near the dead line or with sufficient length of hose for mounting, directly in front of the drawworks at the driller's position.

This portable combination provides the advantage of quick installation which is sought in the Toolpusher Model, but removes the Gauge mechanism from the dead line, where with the Toolpusher Model it is subjected to damaging vibration and possibility of breakage.

Sealite Clipper Weight Indicator.



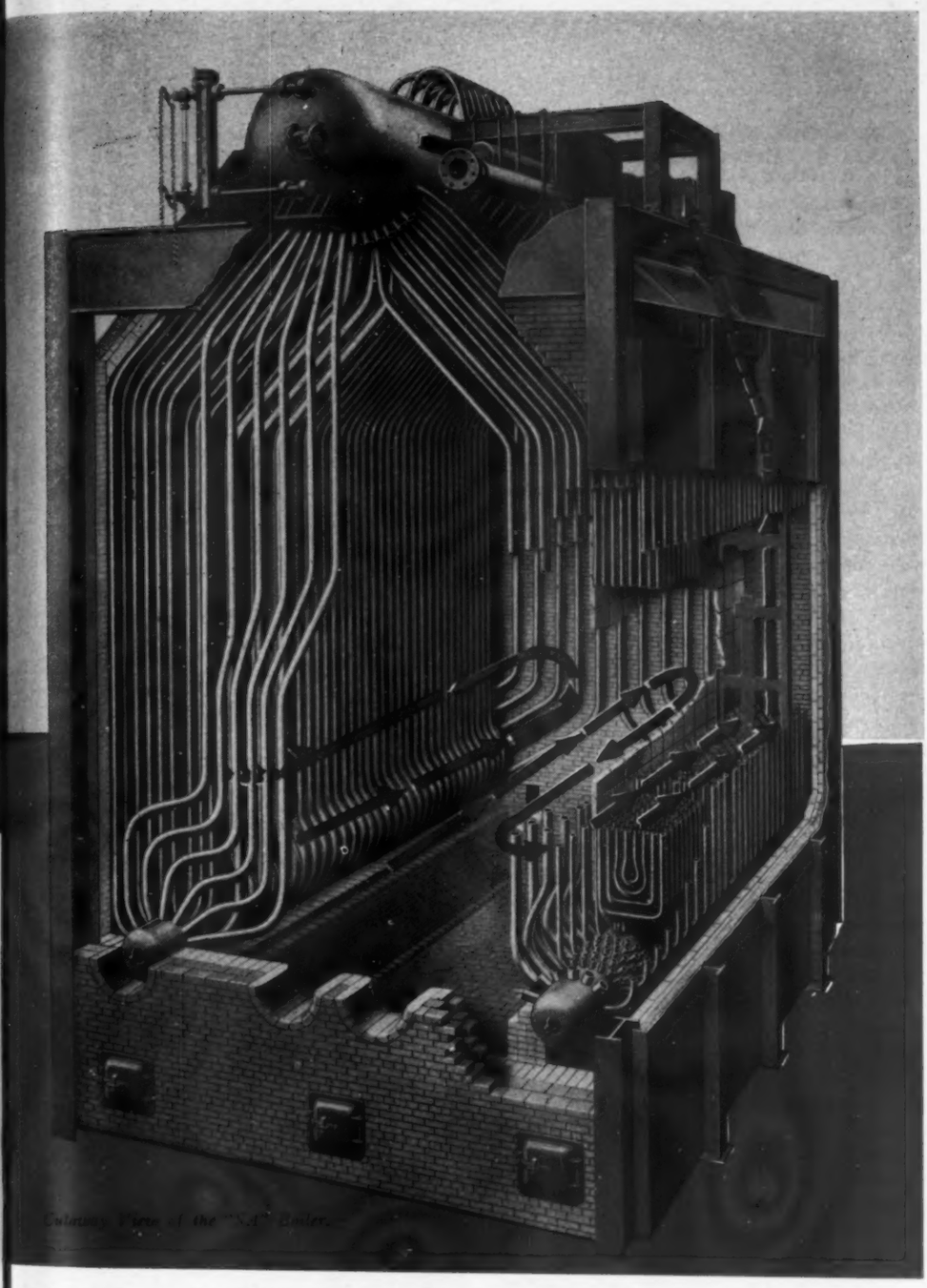
New Combination Burner

THE John Zink CMB Combination Gas and Oil burners which combine the well-proven advantages of the Bi-Mix Gas Gun and the MTB Oil Gun, with a special tile and register design, provide approximately the same heat pattern when firing either or both fuels in combination.

Freedom for orifice stoppage is assured in gas firing regardless of any corrosive nature of the gas since the gas limiting orifice is in a cold zone. Removable gas limiting orifices are furnished to permit change of firing conditions when necessary.

The John Zink Series MTB Oil Gun which is furnished for oil firing is particularly adaptable to automatic control as long as a small gas fire is maintained. The consumption of steam for atomization may run as low as 1.25 lbs. per gallon of oil. Steam for atomization may be dry and at a pressure of approximately 100 lbs. Oil pressure should not be less than 75-lb. and quite steady. Oil should be delivered to the burner heated so that its viscosity as delivered is not more than 25 SSF.

The spider, which is made of heat-resisting alloy, acts as a perfect means of distributing gas over the air stream entering the burner when firing with gas and as an air-cooled diffuser when firing with oil. The tile and register are so designed that both fuels enter the secondary air stream at a point of maximum turbulence.



Cutaway View of the "SA" Boiler.

"SA" Boilers for Refinery Application

ONE of the outstanding characteristics of a refinery is that it operates continuously. Consequently, it is logical to seek a boiler capable of long periods of continuous service.

"SA" boilers consist of a steam drum directly above the furnace and two water drums at each side of the furnace approximately at floor level. Two banks of boiler tubes connect these three drums and they are so shaped as to extend approximately horizontally from the steam drum on each side to form the roof of a furnace and then turn vertically downward to the water drum. This arrangement provides two parallel banks of boiler tubes which form the sides of the furnace and the side water walls at the same time. They virtually eliminate refractory from the sides of the setting and provide ample means for water cooling one or both of the end walls as may be deemed necessary for exceptionally hard service. Space for superheater tubes is available by leaving out boiler tubes in either boiler tube bank and this affords positive means for controlling final steam temperature in a simple manner. Dampers are placed in the gas outlets of both banks and by adjusting them the amount of hot gases passing over the superheater is readily regulated.

Due to the fact that all boiler tubes connect directly to boiler drums, a minimum number of gasket joints are involved and internal cleaning —when necessary—does not necessitate much time and material for making the boiler tight again and ready for service.

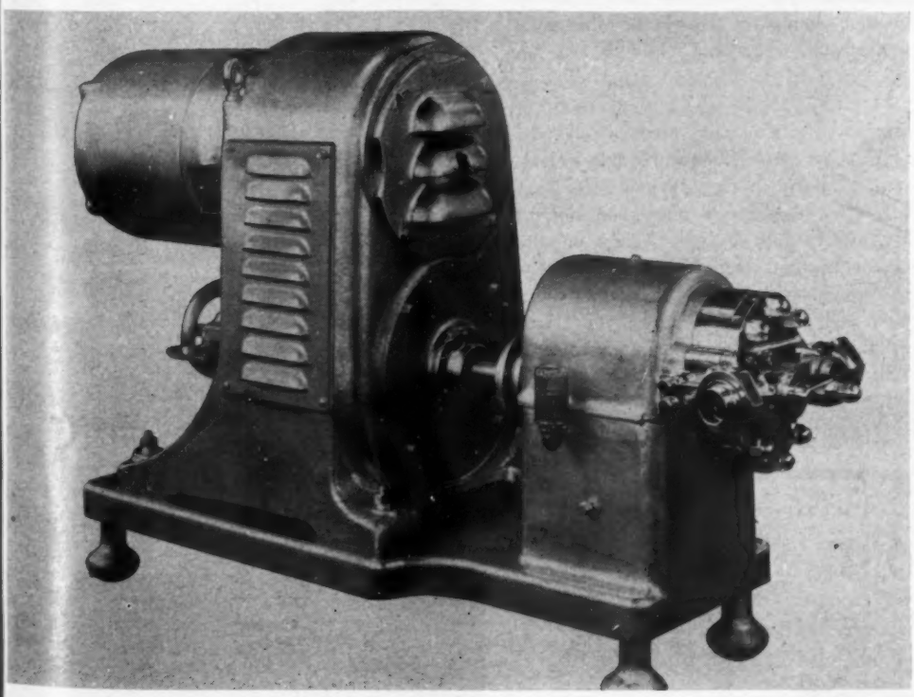
The Flow-Master Pump

THE Flow-Master Pump was designed to meet a production necessity, where no other pump was found capable of meeting the exacting requirements of pumping materials being processed.

The Flow-Master will transfer, meter or proportion any product that can be pumped. It maintains a steady, non-pulsating delivery, positive displacement, high vacuum, no churning, no foaming, easily cleaned.

It is the only pump of this type, as far as we know, that can be guaranteed to maintain volumetric efficiency against normal wear. Eight years' field experience has proved that it is an ideal pump where a quick change from one product to another is necessary.

The Flow-Master is constructed of a stainless metal combination that will not seize or gall. It is made by the Marco Company and it is soundly engineered, ruggedly built!



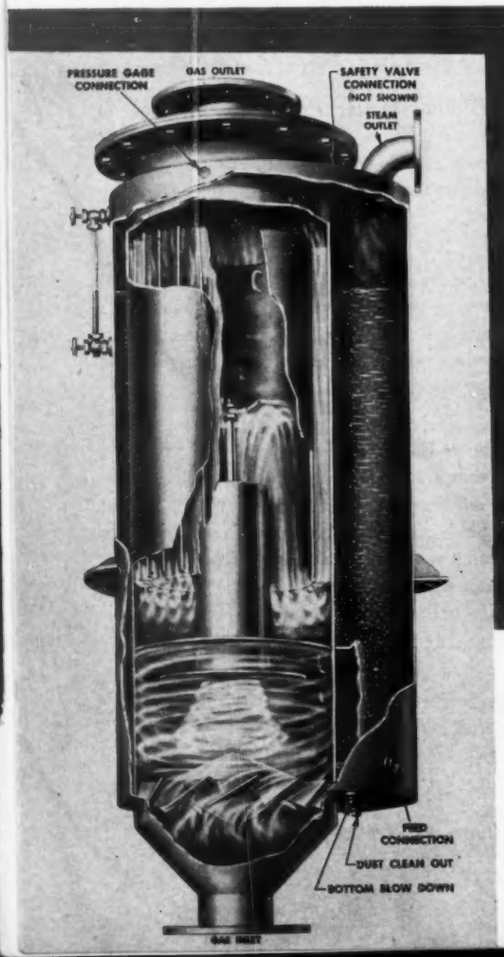
Flow-Master Pump With Speed Reducer.

New Heat Recovery Silencer For Diesels

THE new Vortex Heat Recovery Silencer for Diesel engines developed by the Engineering Specialties Co. Inc., is designed for both marine and stationary installations. It combines four functions in one construction: steam generation up to 30# p.s.i. depending upon the service, hot water heating, exhaust silencing and the removal of sparks and carbon from exhaust gases. According to the Company, it normally occupies little more space than spark arrester-silencers without the steam or hot water features, and provides for a B.T.U. recovery heretofore impractical, due to a recently perfected and exclusive method of heat conduction. As a steam generator, it produces an exceptionally high ratio of steaming rate to engine horsepower due to its exclusive design and unique construction which holds the rate consistently high for most operating conditions.

Owners and operators of Diesel engines will find many uses for this waste heat silencer. The steam can be used for space heating, processing and other services; the unit is equally useful when functioning as a hot water boiler. Furthermore, in many instances it will serve as an auxiliary to separately-fired steam generators and hot water boilers or as an adjunct to carry peak loads.

In other situations, where Diesel engine users have only intermittent need for steam or hot water, the Vortex Heat Recovery Silencer can be operated dry or partially filled without risk or damage.



New Otis Wire Line Tubing Perforating

THE Otis Type L perforator, when used with a removable Otis tubing stop and check valve, provides a means to wash mud from the casing annulus, to install orifice inserts (gas jets) at desired depths in the tubing string, and to put the well on gas lift without exposing the producing formation to the mud column and without moving the tubing string. The complete operation is done within a few hours through use of a regular steel measuring line and does not require a derrick, mast, drilling mud, pulling unit or tubing crew.

Because many wells in the Gulf Coast area were completed with a packer set near the bottom of the casing and mud left in the casing annulus, the first operation in placing such wells on gas lift is to remove the mud from the annulus and then to install the orifice inserts in the tubing walls at desired depths. In most cases where wells are ready to go on gas lift, their bottom hole pressure has dropped to such an extent that the producing formation will not support a column of water or the pressure required to break circulation without breaking down and permitting fluid to penetrate the formation. This, of course, is very undesirable and it is to prevent the water or mud pressure from ever contacting the producing formation that the Otis removable check valve is used. After the mud has been washed from the casing, the check valve and stop are pulled and the well perforated as if it were a straight string of tubing.

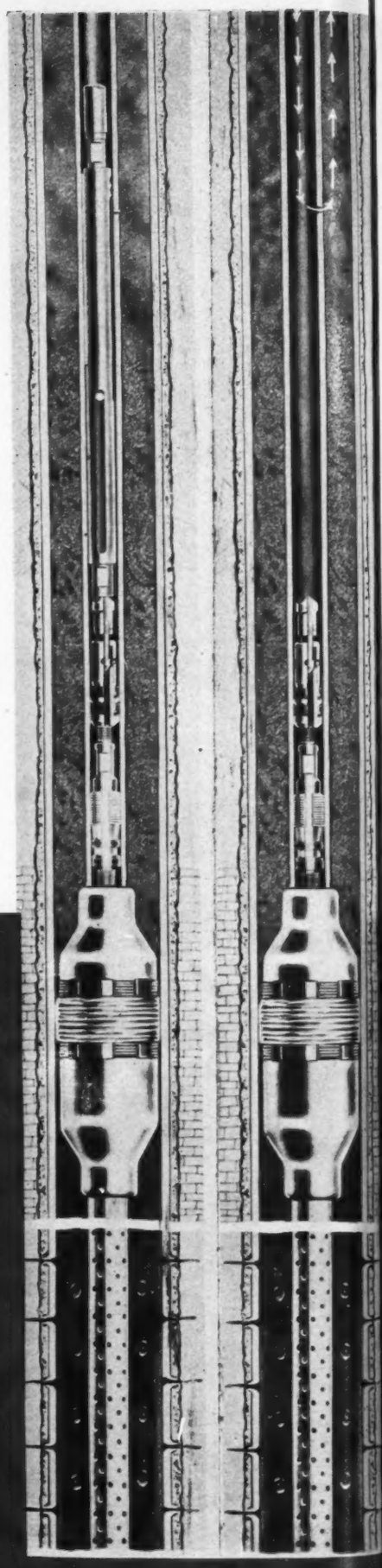


Diagram Showing Installation of Stop, Check Valve and Perforator

Diagram Showing Perforator Ready and Circulation Established

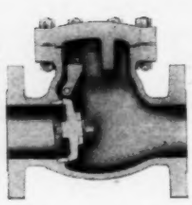
Otis Type "L" Perforator

Swing Check Valves

A new line of OIC Cast Steel Swing Check Valves in the 150 and 300-pound pressure classes is announced by the Ohio Injector Company. They are the full-way type in which the disc completely clears the waterway in the wide open position. The complete disc assembly is suspended from brackets inside the body and is removable as a unit through the cap opening.

This company also announces a completely new line of OIC Cast Steel Globe and Angle Valves. At present available in the 150 and 300-pound pressure classes, they are a companion line to the OIC Steel Gate Valves already on the market. An essential feature is the fact that they are offered with either spherical or plug type discs and seats, in a number of trims, adapting them to fluid control in either full-flow or throttling service.

New Globe Valve



New Check Valve

New Pump Accessory for Deep Well Pumping

THE D+B Division of Emsco Derrick & Equipment Company has recently developed a new accessory for use on D+B Oil Well Tubing Liner Pumps which to some degree will revolutionize certain pumping operations of the industry. The new device is known as a Plunger Hanger.

At the direct request of the United States Navy at the Elk Hills fields, D+B started engineering research and designing some months ago to develop a method whereby a larger size Tubing Liner Pump could be operated on a smaller size string of tubing. Well potentials at Elk Hills were greater than anticipated and the fact that the next larger size tubing of 3″ was not available created a problem. With the nation's need for more oil daily becoming more acute, D+B was commissioned by the Navy to solve the problem. The new Plunger Hanger is the result.

The Plunger Hanger is an inexpensive device composed of three parts—a top half with a sleeve at its lower end, which connects to the small tubing, a bottom half which connects to the upper half giving support to the sleeve, and a special sucker rod coupling with a pin protruding through the sides. The top half is threaded to make up on the tubing string used in the well. The bottom half is threaded to take the top half of the hanger and its lower end is threaded to connect to one joint of tubing of corresponding size to the tubing pump used. The sleeve on the lower end of the top half into which the bottom half is threaded is machined with two inverted "J" slots to take the special sucker rod coupling. To install the plunger hanger one joint of tubing must be used of the same size as that of the pump to be used. For example, if a 3″ tubing liner pump is to be run on a string of 2½″ upset tubing, one joint of 3″ upset range 3 tubing is made up in the top end of the pump. On the other end of this joint of tubing the plunger hanger is installed. From the plunger cage of the pump the assembly consists of a short pony rod, the special coupling with the pin protruding through the sides, and one standard length of sucker rod.

At the time the pump is being lowered into the well the plunger is suspended in the joint of large tubing with the protruding pins on the sucker rod coupling located in the "J" slot. After the tubing is lowered in the well, the sucker rods are lowered and screwed on the rods already in the well. In order to start pumping it is necessary to raise the sucker rods slightly so the protruding pins of the sucker rod coupling near the lips of the "J" slot, turn to the left a quarter turn, and then lower the plunger to the pumping position. The standing valve can be released and the pump is ready to start operation.

In pulling the pump, the plunger is lowered to pick up the standing valve in the conventional manner. Then the plunger and standing valve are raised by means of the sucker rods to completely remove the plunger and standing valve from the liner column into the upper joint of tubing. As this is done, the protruding steel pins on the sucker rod coupling are guided into the "J" slot, the rods are turned a quarter to the right, and lowered to rest in the slot provided. In this position the plunger and standing valve are hung in the joint of tubing above the pump, allowing the oil to drain around the special sucker rod coupling, plunger and standing valve. The "J" slot then acts as a clutch in breaking the sucker rod string. After the sucker rods have been removed from the tubing, the tubing can be removed from the well. The fluid will drain through the pump permitting the tubing column to empty the oil contained in it as it is pulled. Thus the operator can pull his tubing string "dry" instead of "wet" as he has had to do in the past.

Although the basic purpose of the plunger hanger is to permit the use of a larger size pump on a smaller size string of tubing, the attendant advantages in its use have proved of real importance. As mentioned above, it eliminates the customary "wet" job in pulling tubing and provides a clutching action that can be obtained by using the "J" slot for tightening or breaking the sucker rods. In addition, the plunger hanger eliminates wear and tear on the plunger as it is not necessary to lower it through the tubing. the use of the plunger hanger with a pump using normal size tubing.

D+B Plunger Hanger is positive in its operation and installations to date have not only proved its practicability but have been a subject of great interest to oil operators everywhere.

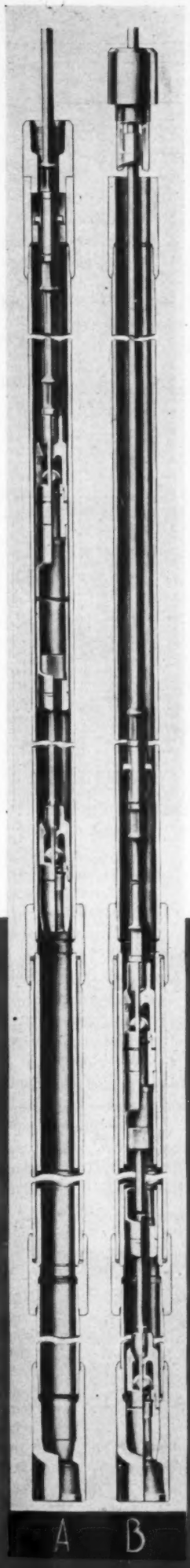


Illustration A shows the Plunger Hanger made up with a D+B tubing liner pump, with the plunger and standing valve removed from the liner column and suspended in the joint of large tubing immediately above. The protruding pins on the special sucker rod coupling are located in the "j" slot in the lower end of the top half of the hanger. This position of the plunger and standing valve permits the oil to drain around the special sucker rod coupling, plunger and standing valve.

Illustration B displays the position of the Plunger Hanger while the pump is in operation. For purposes of illustration, the top half of the Plunger Hanger is shown separated from the lower half. Note that the standing valve has been released and the plunger is in normal pumping position.

Joint Compound for Oil Pipe

X-PANDO PIPE JOINT COMPOUND, a prepared dry powder pipe cement which expands as it sets, manufactured by X-Pando Corporation manufactured by X-Pando Corporation has received a certificate of approval after months of extensive tests conducted by Underwriters' Laboratories, Inc., and is now listed under their reexamination service. The tests, which were made on several types of joints in lines carrying butane, gasoline and other petroleum oils, proved the safety, the reliability and efficiency of X-Pando pipe joint compound.

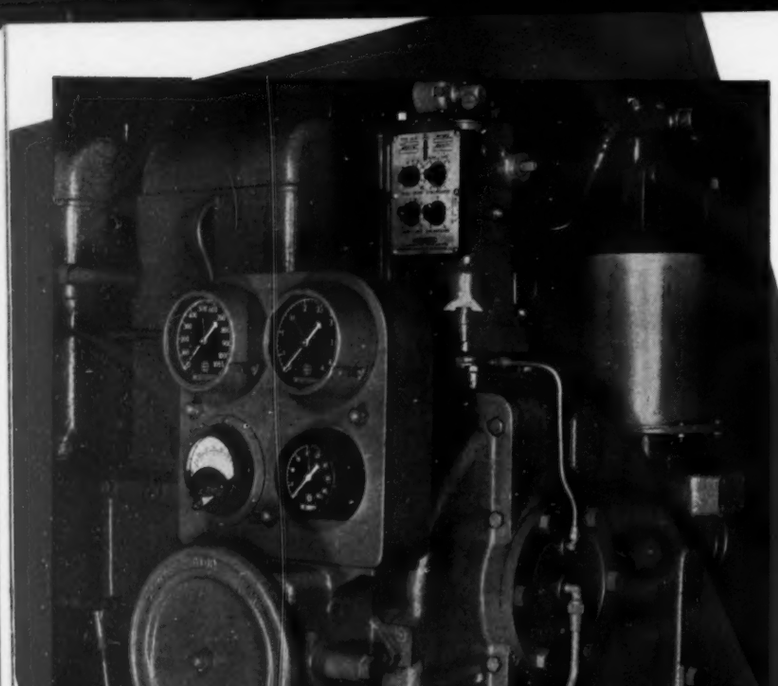


Fig. 3—Control End of a Cooper-Bessemer Type JS-8 Diesel Engine.

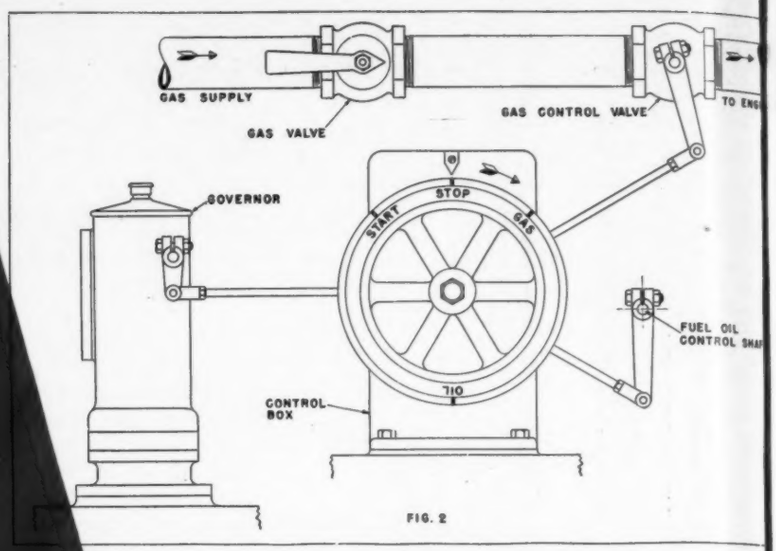


FIG. 2

Diesel Engine Operates on Oil or Gas

A new development in the Diesel engine field, which will enable the engine operator to use either gas or oil as fuel without any electrical sparking device, and which will cut fuel consumption of gas engines by from 20 to 25 percent, has been announced by The Cooper-Bessemer Corporation, Diesel manufacturers.

Heretofore gas Diesels have been built wherein the air only was compressed and the gas was injected on top dead center under very high pressure. No thought was given to the possibility of admitting the air and gas together because of fear of premature ignition due to the hot spots in the combustion chamber. Cooper-Bessemer, however, found that it was possible to admit the gas with the engine air intake and still be completely free of any evidence of premature ignition, and their new gas-or-oil Diesel engine has now materialized.

Assuming a Diesel oil engine in operation and on load, if gas is admitted in the intake air the governor obviously will immediately reduce the amount of oil to compensate for the percentage being carried by the gas. It then merely becomes necessary to reduce the fuel oil injection to the desired minimum and then govern the percentage of gas according to load. Such a system is shown diagrammatically in Fig. 1. It is clear that to convert the oil engine to the gas engine it is, therefore, merely necessary to remove the fuel oil system from the governor, set it in the minimum position and connect the governor to the gas regulating valve. This is an extremely simple move and requires not more than a few minutes.

In the normal case, a shutdown of a few minutes to make this conversion would not be of any consequence. There are cases where the gas availability varies frequently, as for example, in sewage disposal plants. There it is desired to be able to instantly change from oil to gas, or vice versa, or even to maintain a mixture of the two where there is insufficient gas to pull the load. To do this obviously requires some form of controls so that the operator can at will change from one fuel to the other, or even arrange it so that the engine automatically goes from one to the other as the gas availability fluctuates. Such controls are illustrated diagrammatically in Fig. 2.

Fig. 3 shows a 675 horsepower Cooper-Bessemer Diesel engine with the gas-oil mechanism assembled on the control end.

There are hundreds of installations of Diesel engines, or of gas engines, which have been installed as convertible units, because of the uncertainty of the future of the particular fuel they are using. This is particularly true, of course, when installing an engine in a gas field of questionable future. The usual means of convertibility is by change of pistons, or of cylinder heads, or by means of spacers under the cylinder heads which will increase compression space when converting to gas. The conversion then consists of changing from an electrical ignition system to a fuel oil system or vice versa. The change obviously requires considerable time and involves expensive parts.

Since, in order to make such an engine convertible, it must be designed as a Diesel engine anyway, and it is therefore capable of withstanding the pressure of the Diesel cycle, it is obvious that the burning of gas on the Diesel cycle not only conserves gas, but also provides a very much simplified conversion. The value of this latter is apparent when considering pipe line compressor engines for example, since it would be highly advantageous to convert to oil in critical times of gas shortage such as we have experienced quite recently.

New Triplex Slush Pump

The Emsco Derrick & Equipment Company announces the addition of the Emsco A-10 Triplex Slush Pump to their line of oil-field equipment. The Emsco A-10 Triplex is an all-steel power pump, having three double-acting cylinders, in contrast to two double-acting cylinders found in slush pumps of conventional design. The fluid end and the power end are made of cast steel and structural shapes, which makes the entire unit light and rugged in construction.

The advantages of a three-cylinder or Triplex pump are its uniform power requirement during operation and the elimination of high and low surges. For example, a 12″ stroke Double Acting Duplex Power Pump equipped with 7¼″ liners producing a mean effective pressure of 445 pounds has a high surge pressure of 620 pounds and a low pressure of 340 pounds, a difference of 280 pounds between "high" and "low". The horsepower, consumption at peak surge pressure will be 228 H.P., while at low it will be 126 H.P. This produces an unbalanced condition and forces the prime mover to adjust itself to the horsepower requirements of the pump. The Duplex pump as described above will have four unequal surges of 540 pounds, 620 pounds, 475 pounds and 410 pounds during the revolution of the crank.

Now consider the Triplex Double Acting Pump. A Triplex pump having 6¼″ liners and a 10″ stroke, producing a mean effective pressure of 440 pounds, will have six uniform surges of almost equal pressure and at even intervals. The high pressure in this case will be 465 pounds and the low will be 375 pounds, or a difference of 90 pounds as compared with 280 pounds of a Duplex pump. The horsepower requirement of the Triplex Pump at peak pressures will be 230 H.P. six times per revolution of the crank and 187 H.P. at low pressure during the same cycle. These even and uniform surges of low intensity will allow the prime mover to operate at a more constant power output.

The Triplex Pump with its constant even flow of fluid will save wear and tear on the pump, prime mover, V-belts, will not whip the rotary hose line and will not hammer the lines from the pump to the rotary hose. This adds to the life of the pump, the prime movers, V-belts and the hydraulic system of the drilling rig.

The Emsco A-10 Triplex Slush Pump incorporates the following features: all steel construction; less weight; exposed type fluid liners; a fluid end easily repaired in the field by welding; renewable crosshead guides in frame; compact, rigidly welded power end frame. It also utilizes the Emsco design of suction and discharge valves of the same size, in the same pot and under one valve cover. This provides ease of access, permits a substantial reduction in weight, and allows an extremely narrow construction.

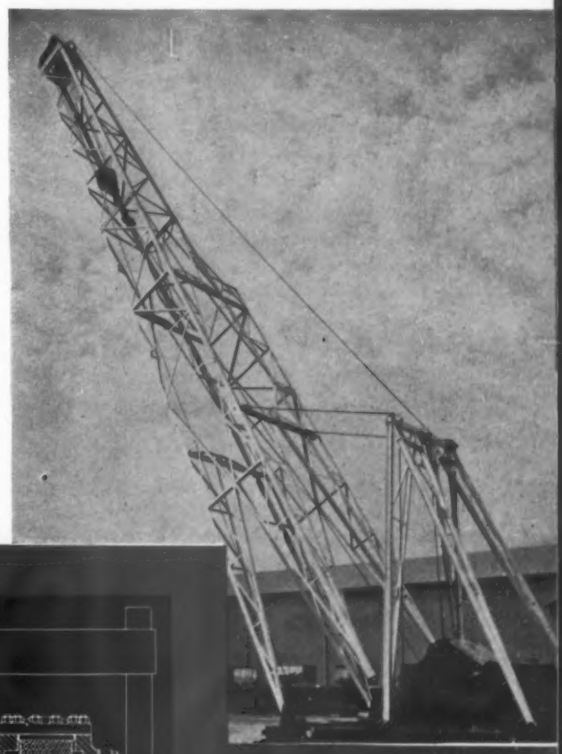
Emsco 12-P Portable Mast

THE Emsco 12-P Portable Mast is fabricated in 7 welded sections for convenient transportation. These sections are quickly and easily assembled on the ground or on cribbing. The crown and traveling blocks are strung for drilling and, with the aid of an auxiliary line, the mast is raised by the drawworks. The skid base breaks down to road widths for hauling and is furnished in lengths to suit the rig. Any standard unitized drawworks and any rotary table may be used.

The 12-P Mast is designed to eliminate a number of weaknesses existing in conventional portable masts, which makes it a welcome addition to the oil well drilling equipment field. Perfect visibility, resulting in safety, is permitted because: Patented bulge construction for inside racking makes it possible to eliminate an open face and thus avoid interior bracing; the line arrangement used in raising and lowering the mast avoids the use of interior trusses; the legs are spaced symmetrically with respect to the center of the well, resulting in exceptionally favorable working conditions on the floor; a high V window affords the advantages of an open face. All of these features give perfect visibility between the driller and the working platform and clear unobstructed working space inside the mast.

Raising and lowering of the mast under conventional operation constitutes a safety hazard. The method by which the 12-P Mast is raised and lowered overcomes this. A positive strain is kept on the line at all times during the raising or lowering operation by means of a pivot point change. The center of rotation is shifted by an arrangement of the base connections, making it unnecessary to pull the mast off center when lowering it or to use a snub line when raising it. In other words, the center of gravity of the mast never passes over the pivot and thus a slack line cannot develop. A dropped mast is not possible and safety is assured.

Other outstanding features of the 12-P Mast should be recognized. Lacing of all four faces results in a stiffer mast than can be secured by internal bracing. No guying is necessary. The crown block is concentrically mounted, resulting in an equal loading of the legs. This means better distribution of the load on the foundation. Working platforms are floored with heavy expanded metal, providing a non-slip surface without interfering with visibility. The platforms are hinged and can be folded up against the face of the mast, if desired. Standard equipment includes a catline sheave, built-in deadline anchor and ladders on both ginpole and mast. Optional equipment includes sandline sheave and crown safety platform. Unitized sectional steel substructures are available in 5′ 4″ and 8′ 4″ heights.



EMSCO
TRIPLEX A-10 POWER PUMP

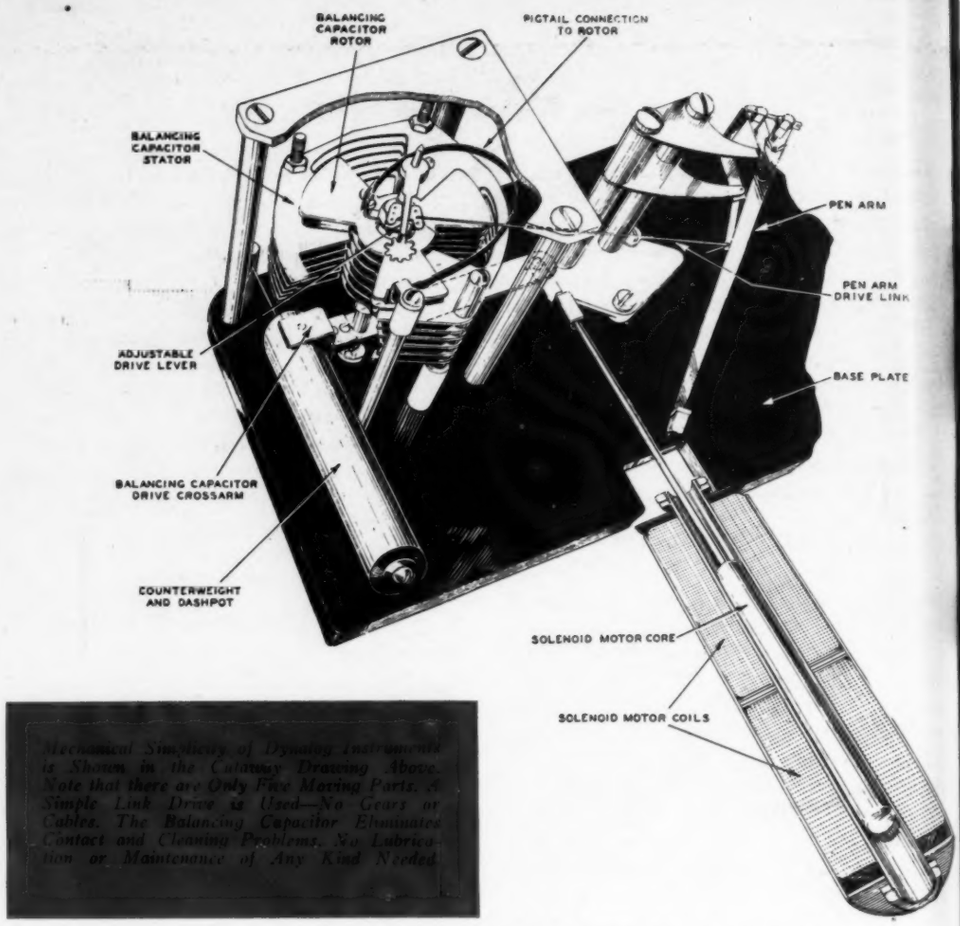
Aer-O-Foam Pressure Proportioner.

Announcing National Aer-O-Foam

THE principle of producing foam mechanically is not new. It has been in use in Europe for many years, but in this country only recently has foam been made in this manner in large quantities and of a quality comparable to chemical foam. Under the impetus of war-time need, National Foam System, Inc., engineers and chemists have produced for the U. S. Navy mechanical foam units which are simple in operation, speedy in performance and adequate in all respects to the tremendous task of extinguishing fires at sea on our fighting ships.

The problems involved were not simple. The mechanical foam equipment in use before the war was cumbersome and complicated. Add to this the difficulties incident to the development of a foaming agent that would not only produce foam of good quality under all conditions of water temperature and extremes of climate, but would remain in good condition in storage for indefinite periods.

Besides the Aer-O-Foam it was necessary to develop the necessary mechanical accessories such as nozzles and proportioners. Of necessity, in the interest of speed of production, development was confined to a very few units. First, the National Aer-O-Foam Nozzle with pickup tube, Type NPU, which may be used with any water line given 60 gpm at 75-1000 pounds flowing pressure. This nozzle picks up the liquid from five-gallon cans and enables one man to produce a stream of foam at the rate of 500-600 gpm. One can of liquid will operate the nozzle at this rate for a period of one and one-half minutes. A second man carrying and opening cans may prolong this period of operation just as long as there is liquid available.



Mechanical Simplicity of Dynalog Instruments is Shown in the Cutaway Drawing Above. Note that there are Only Five Moving Parts. A Simple Link Drive is Used—No Gears or Cables. The Balancing Capacitor Eliminates Contact and Cleaning Problems. No Lubrication or Maintenance of Any Kind Needed.

Simplified Design in Foxboro Dynalog Instruments

BY employing electronic principles throughout, in designing its Dynalog Recorders and Indicators, the Foxboro Company has attained notable simplification in the principles and construction of instruments for precision measurement and control. In the Dynalog Temperature Recorder, for example, a variable balancing capacitor assembly, having only five moving parts, replaces the usual galvanometer, feeler and clutch mechanism. By direct linkage, the solenoid motor, operated by resistance bridge unbalance, drives the recording pen. The measuring system and the null-balance circuits are thus joined in the single, intergrated electronic system which is featured in Dynalog design.

One conspicuous advantage thus obtained is the virtual elimination of mechanical maintenance, as there is nothing to clean, lubricate, adjust, take up or replace either in the measuring circuit or balancing system.

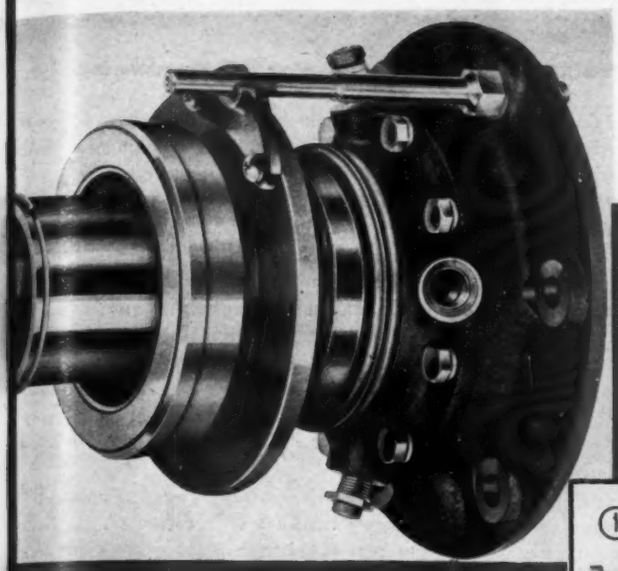
Dynalog Temperature Recorders and Indicators, employing the resistance bridge circuit principle, are the first of several types of Foxboro electronic instruments to be released for general industrial use. These instruments have already been proved in principle and design by four years of use in the testing and development of military equipment. Now available to the petroleum industry and for other essential work, they will find use wherever high sensitivity and speedy response, as well as simplicity of instrument design, are important considerations.

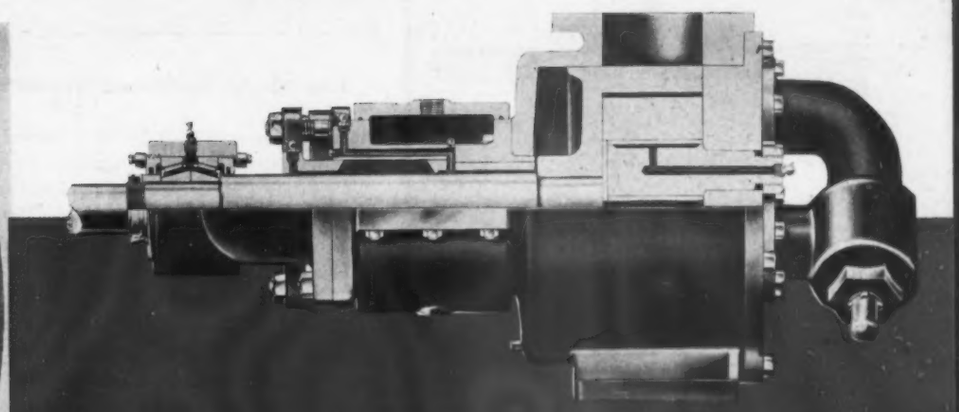
Resistance bulb circuits give these instruments high accuracy of measurement of temperatures and temperature differences, on our products, close-cut columns, deisobutanizers, for temperature surveys on columns and in other applications throughout the refinery. In the production of butadiene and high octane gasoline, and in many of the operations in the petroleum chemical plant, such characteristics give the Dynalog instruments particular usefulness and value.

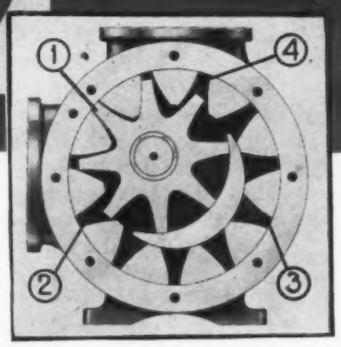
Mechanical simplicity of the Dynalog instruments is clearly shown by the accompanying illustration. A variable balancing capacitor is used to eliminate sliding contact and slide wire cleaning problems. A push-pull magnetic balancing drive motor eliminates bearings and gear trains with their periodic maintenance and possible failure.

D-C Electric Drive for Rotary Drilling Rigs

A highly improved, d-c electric drive for rotary rigs is now offered by General Electric for drilling to any depth. Unique features of control simplify and reduce the size of the control, speed up the operations, increase the ease and range of adjustment in the field, shorten the rigging up and tearing down time, reduce the cost of operation, and lengthen the useful life of the equipment.







New Heavy-Duty Clutch

HYDRAULIC actuation of heavy duty clutches is now possible through the use of the "Hydrolease" unit, a new product announced by Pesco Products Co., (a division of Borg-Warner), producer of aircraft pumps and related accessories.

The Hydrolease is merely connected with hydraulic tubing to the master cylinder, thereby eliminating a number of levers and linkage and points of lubrication. This results in important savings in weight and cost, in addition to the operation afforded by hydraulic actuation. A special constant adjustment feature of the Hydrolease means much longer wear for plate linings and other vital clutch parts.

The Pesco Hydrolease is a hydraulically-operated clutch actuator which revolutionizes clutch throwout mechanisms for trucks, busses and other heavy-duty motor vehicles as well as for industrial power clutches, including drilling rigs.

The Hydrolease is designed to replace the mechanical throwout mechanism of the conventional clutch. One simple compact unit replaces many mechanical parts, and offers many advanced operating and economy features.

Because it applies the smooth, positive force of hydraulics to the clutch throwout mechanism, it reduces pedal pressures as much as 50 per cent. It eliminates "creeper gear jerk", it substantially reduces wear and tear on the vital clutch parts because it keeps clutch clearance in constant adjustment. This means longer life for clutch linings and working parts, and reduced maintenance expense.

The Hydrolease has been exhaustively tested and proved in the Pesco Engineering Laboratories—and on the road.

Viking Heavy Duty Pump

AN up-to-date heavy duty rotary pump, made by the Viking Pump Company in sizes from 200 to 1050 gallons per minute is shown in the accompanying Figure 1.

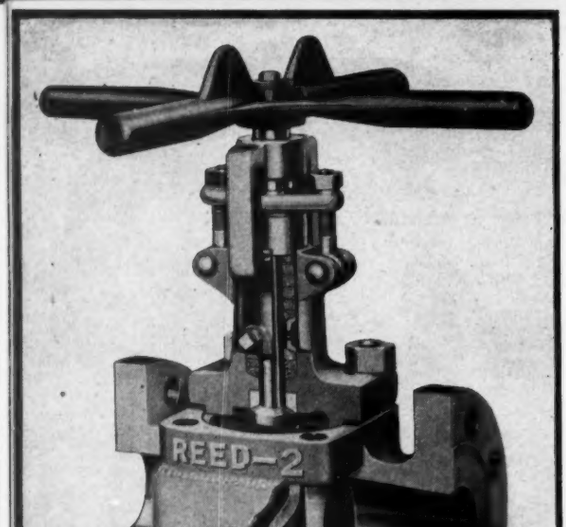
The construction of the working organ of this particular style of rotary pump is shown in Figure 2.

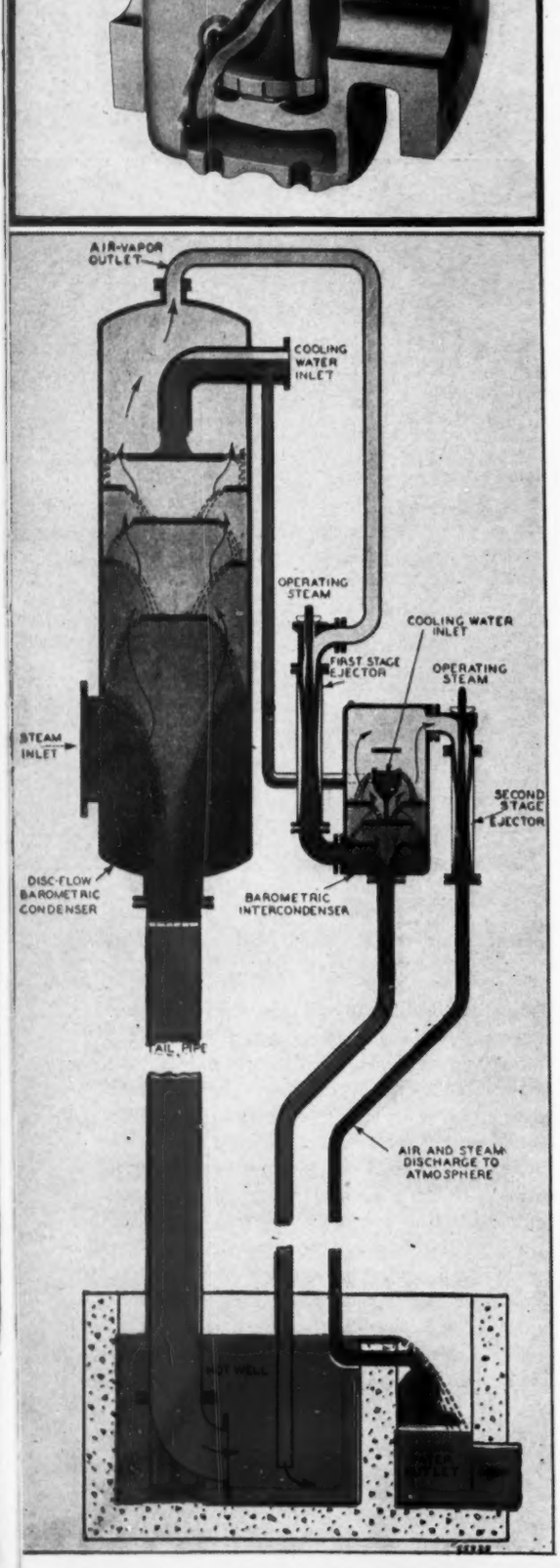
The amount of liquid pumped per minute varies in direct proportion to the revolutions per minute of the pump shaft. Refer to accompanying illustration: 1-Rotor and idler mesh, forming barrier between ports. 2-Idler drawing away, creating suction and opening to be filled with liquid. 3-Spaces between rotor teeth mesh again, forcing liquid out.

The Viking heavy-duty pump is ruggedly built to withstand long and hard service. It is equipped with heavy-duty rotor thrust bearing, positively positioned against a shoulder on the shaft and mounted directly on the pump housing itself. It is also provided with a liquid cooled stuffing box. The liquid being pumped can be used as a cooling medium by circulating it from the discharge port to the opening in the jacket, and returned from the bottom of the jacket to the suction port of the pump. If desired, an auxiliary pump can be installed which would circulate water or any other cooling medium through this jacket in the same manner. This liquid cooled stuffing box is available on the model N332, 5", 450 gpm.' R332, 6", 750 gpm.; and P332, 8", 1050 gpm. sizes only.

Mast Portable Shot-Hole Drilling Rig

GEOPHYSICAL surveying crews have to travel light and get about over rough territory. For this reason their equipment must weigh as little as possible. This is especially the case with the equipment used for drilling shot holes, which should be maneuverable as a Jeep, and at the same time be able to supply enough weight on the drill to obtain a satisfactory rate-of-penetration of the bit. To meet this requirement the Engineering Laboratories, Inc., have developed the rig shown in the accompanying picture, and also have developed a time-saving technique in the use of this equipment. The degree of portability put into this rig is said to exceed that attained in previous forms of this type of equipment.





The Reed Jacketed Steel Valve

MANY materials such as: tars waxes, sulphur, asphalt, pitches, petroleum residues, molten caustic, etc., are very viscous and tend to harden and congeal at ordinary temperatures. These materials must be kept fluid for transmission through lines and fittings.

To meet the demands of these services Reed Jacketed Steel Valves, made by Reed Roller Bit Co., have been developed and the effective jacketing design, plus the easy operating characteristics and cleaning action of the discs, assure dependable operation at all times. Reed valves do not require lubrication, and maintenance costs are a negligible factor.

Expansion and contraction, due the temperature changes, does not affect the action of the Reed valve discs, which are accurately guided by the disc holder, yet are free to float with respect to the holder and the body seat. This construction is assurance against sticking and the detrimental affects of expansion and contraction under temperature.

Reed Jacketed Steel Valves are interchangeable with wedge gate standard steel valves and are supplied with A.S.A. standard for O.S. and Y wedge gate valves.

Disc-Flow Barometric Condensers

THE disc-flow barometric condenser is a distinctive type of counter-current design, developed by Ingersoll-Rand after 25 years' experience in building various other types and exhaustive research employing modern testing facilities and full-size experimental units. They are efficient and their simplified construction results in low cost of maintenance. They are available in sizes up to 120" diameter to handle up to 12,000 gallons per minute of cooling water.

Disc-flow barometric condensers are suitable for any vacuum service where it is not necessary to reclaim the condensate. They are widely used with steam engines, steam turbines, vacuum pans and evaporators. They are also ideal for high-vacuum processes, such as vacuum cooling, distillation, impregnation, hydration, dehydration, etc., and for use as air or gas washers. Since there are no nozzles or small openings, they may be used when the cooling water contains debris. Where there is a wide fluctuation in load, they are economical since the cooling water can be reduced as low as ¼ of that used for full load rating.

Disc-Flow Water Distribution Reduces the Load on the Steam-Jet Ejector. The thin, uniform water curtain maintained under all operating conditions reduces the pressure differential required to pull air and non-condensibles through the condenser. At the same time more cooling water surface is exposed to the non-condensibles to obtain thorough devaporization, thereby decreasing the load on the steam-jet ejector. The flow is counter-current. Thus the coldest water is used for cooling the devaporizing the non-condensibles. Flow areas are correctly proportioned for most efficient steam velocities during condensation and air-vapor velocities during devaporization.

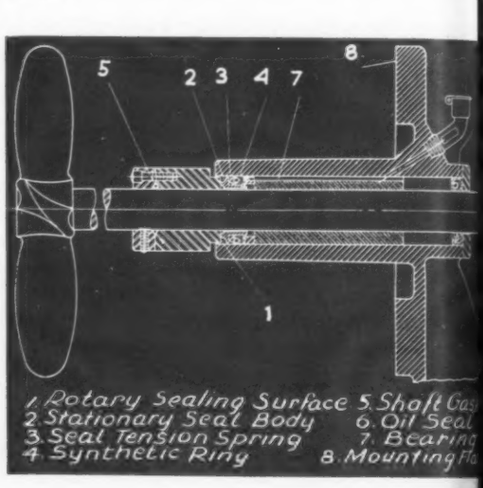
Water Distribution is Non-Clogging and Self-Cleaning. No weirs, spray nozzles or perforated baffles are used with the disc-flow condenser. There are no pockets where dirt or debris can collect and obstruct the flow of either water or vapor.

Ample-Size Air-Removal Equipment. The quantity of non-condensibles that a condenser will handle is dependent upon the size of the air-removal equipment. Suitable air-removal equipment, either of the steam-jet ejector type or the reciprocating vacuum pump type, can be furnished to meet any operating conditions. Ordinarily, either a single-stage ejector for low vacuums or a two-stage ejector with barometric type intercondenser is furnished for high vacuums.

Agitators For Oil Processing

IN blending tanks, and in operations in oil treating requiring the use of oil-insoluble liquids or where a solid substance is in suspension it is necessary to use an agitator. With non-volatile liquids and with tanks that are not too deep the agitator may be suspended from above. But where the operation is in deep tanks and with volatile liquids, and particularly in pressure or vacuum tanks, the agitator may have to be introduced at the side, below the level of the liquid. In that case, the propeller shaft has to be enclosed in a bushing, and the bearing has to be lubricated.

For meeting this situation the Eastern Engineering Company provided new features not used in any other type of mixing equipment. These are a twin rotary seal and a mechanical rotary seal; the latter as illustrated in the accompanying sketch.



Utility Winch

THERE are many jobs in the oil field which only a machine with a strong pull can handle. Such a machine is the latest "Hyster" D4 Sliding Pinion Type of utility winch for raising poles, hoisting heavy equipment, skidding 175,000-lb derricks to new locations, and in general for any pulling, lifting or towing operation. It is made by the Willamette Hyster Co. The accompanying illustration shows one of these little giants pulling an oil well in the Bradford district. It is mounted on a "Caterpillar" D4 tractor. It is a very handy instrument for doing things in swampy areas.

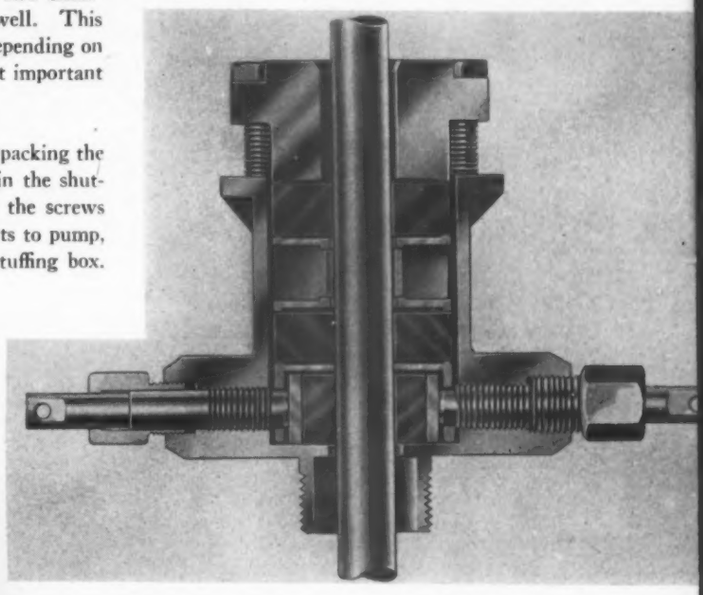
A special type is produced for oil and gas well service. In addition to regular line speeds this type provides a much higher range of speeds by merely interchanging the intermediate drive gears between the transmission and intermediate shafts, which will develop pulls at high speed. This is an important feature when light loads are to be handled at high speeds.

Latest Improved Stuffing Boxes

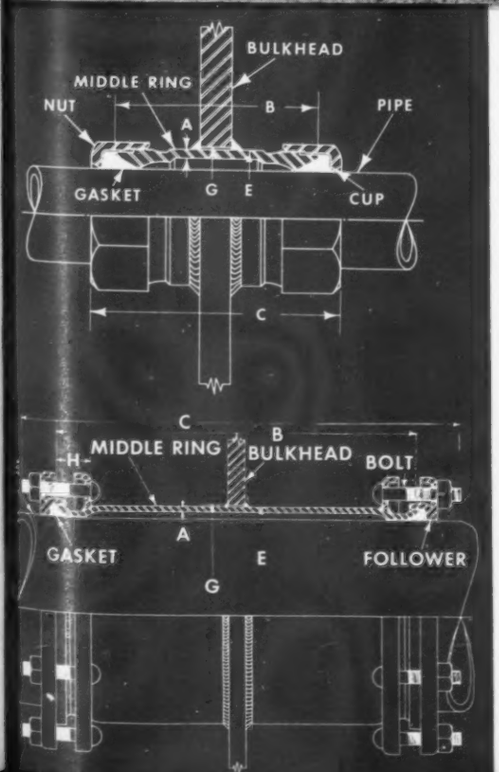
J. P. RATIGAN No. 175 and No. 176 Stuffing Boxes receive their lubrication directly from the pumping well, and are the only self-oiling stuffing boxes on the market. Both types function exactly the same, except that the No. 175 has no shut-off feature. The hole in the rubber is made for the size of the polish rod, while the holes in the metal parts of the body are larger.

The inside of the box is removable, so that the device has two oil chambers; while another arrangement inside the body keeps the two chambers filled with fluid from the well. This method of self-lubrication, without depending on the human element, is one of the most important improvements in stuffing boxes.

The No. 176 can be shut off while repacking the box by tightening the screws evenly in the shut-off; but care should be exercised as the screws must be loosened before the well starts to pump, or the fluid will not get up in the stuffing box. When the screws are not tight against the rubber, the stuffing box is free to function properly. For a further check on the fluid coming up through the by-pass, the pumper may loosen the plug in the cap just a little, and if the by-pass is free, the oil will flow immediately. If the oil does not come through, the screws in the shut-off are too tight. When repacking, both rubbers must be removed. Instructions for installing are supplied to oil companies, and included in all foreign shipments. When ordering, the correct size and type of thread, and size of polish rod, should be specified.



Above: Sectional View — Ratigan No. 176 Stuffing Box



Bulkhead Seals for Piping

A new type of bulkhead seal has been introduced this year by Dresser Manufacturing Division, makers of pipe joining and repair products. Its principle use is to seal and cushion piping that passes into or through bulkheads and deck penetrations, as on oil tankers. Other advantageous uses in the petroleum industry are for tank seals and pipes passing through walls or structural members.

Installation of Bulkhead Seals on naval craft enables piping to be fitted in one-fourth the time formerly required. To fit and weld together a make-up of pipe and fittings to accommodate pipepassages through bulkhead and deck penetrations was a long, tedious and exacting job under old methods of construction.

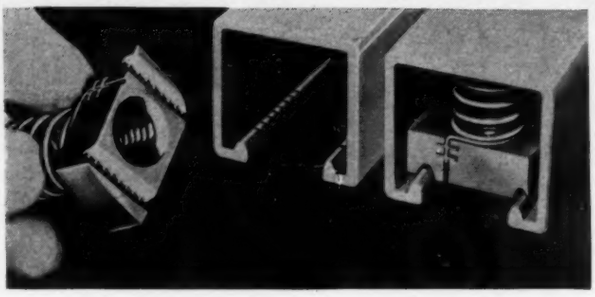
The bulkhead seal is essentially a stuffing box gland. It consists of a few accurate, carefully engineered parts, easily and speedily installed, using only regular equipment and an ordinary wrench. Metal parts are of steel. Resilient gaskets are available in plain or armored types.

The flexible gasket pipe-grip embodied in the bulkhead seal permits free and independent movement of the pipe, to expand, contract and deflect in passing through a ship's bulkhead. This avoids the possibility of harmful stresses.

Trial runs have demonstrated that vibration noises are effectively dampened. The pipe is surrounded in the middle ring or sleeve of the bulkhead seal by resilient wedge-section gaskets. Metal to metal contact and the transmission of vibration are thus greatly minimized.

The bulkhead seals are used on all types of lines through which fluids are to pass. Their main advantage, according to naval architects engaged in the ship-building program, is their flexibility. The seals are used in bilge and ballast lines for salt water, on deck penetrations for hot and cold fresh water piping. They are also suitable for use with oil and other fluids, and for use on steam up to 100 psi. in other types of installation.

Dresser Bulkhead Seals for Piping



Unistrut Framing and Support System.

New Framing and Support System

FABRICATION of any type steel frame stock rack, support or hanger for industrial or electrical requirements now can be quickly and easily completed right on the job by the new Unistrut method. (See illustration).

Unistrut consists of a slotted hollow-square section and a standard spring-held nut attachment. Unistrut does not require drilling of holes, riveting or welding, and can be cut to any desired length with a hack saw.

The nut attachements can be slid along in the hollow square to any point or points where it is desired to attach it to (1) another Unistrut member, (2) a supporting structure, (3) or to the floor, ceiling or wall.

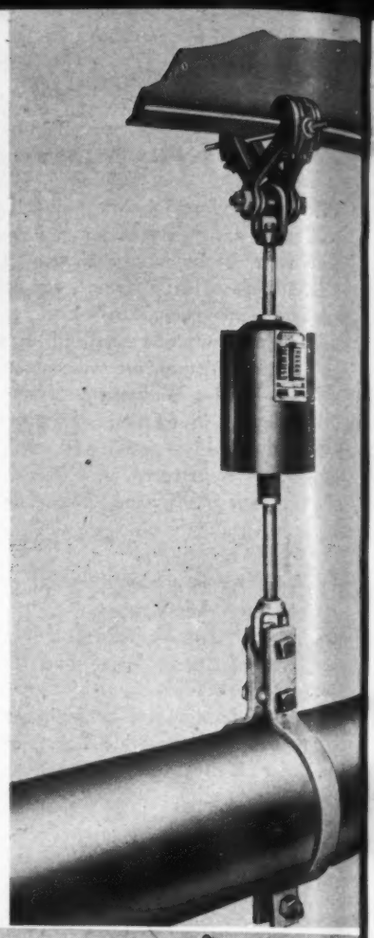
The Unistrut nut has serrated teeth which bite into the inturned edges of the hollow square section, and hold the attachment firmly in position when the nut is tightened with an ordinary wrench. However, the nut can be easily loosened the attachment moved to a new location and again tightly fastened.

Because of its hollow square design, Unistrut has the necessary properties for use as a compression member, strut, column, beam or tension member. It is furnished in steel sections in several sizes or gauges, usually 16-ft. or 20 ft. long, but available in shorter lengths, Unistrut eliminates the delay otherwise frequently caused by waiting for delivery from a rolling mill or warehouse.

Among the numerous products and applications that have been made with Unistrut, are storage bins racks, shelving and boxes; factory tables, benches, etc.; framing for many kinds of indoor and outdoor structures; supports and hangers for all types of electrical or mechanical equipment or systems, etc.

Pre-Engineered Spring Hanger

AN inherent charactertistic of a simple spring hanger is that the supporting force varies with the deflection of the spring This change in supporting force often acts to set up undesirable stress in the pipe and therefore should be kept to a minimum in order that the resulting stress be negligible.



Grinnell Spring Hanger.

The Grinnell Pre-Engineered Spring Hanger was developed by the Grinnel Company, Inc., after years of experience in analyzing the problems of modern flexibility supported piping systems. The spring design allows only 12½% maximum change in the supporting force of the hanger in ½" vertical travel of the piping.

The hanger is made in 14 sizes with a load range from 84 lbs. to 4700 lbs.. The proper size can be selected from a simple capacity table after the load has been computed. Installation is simplified by integral load scale and travel indicators. A unique swivel coupling provides adjustment.

Its all-steel welded construction meets pressure piping code. Guides prevent contact of coils with casing or hanger rod and assure continuous alignment and concentric loading of the spring. Its compact design cuts required headroom to a minimum.

Descriptive bulletin, giving full data on the hanger, is available from the Grinnell Company, Inc.

Mobile Spudder for Drilling and Servicing

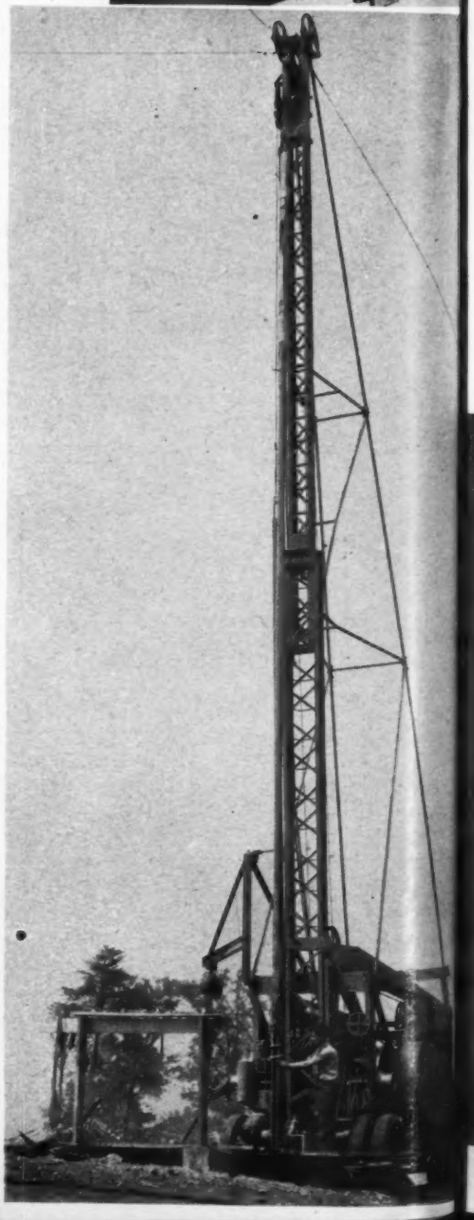
EXTREME mobility that permits tear-down on one location, complete move, and new set up, all in less than eight hours, is a feature helping to make the up-to-date Bucyrus-Erie 36-L Spudders outstandingly economical cable-tool drilling and servicing units.

Design of the all-steel 36-L provides a quick-telescoping derrick (54 feet high when fully extended) which is easily raised or lowered with a built-in-worm-gear-driven power winch. Compact folding pipe braces hold the derrick securely during operations and make tearing down or erecting a simple process. Speedy mountings (on semi-trailer or skid) permit moving at speeds of 25 to 30 miles per hour.

The big capacity 36-L handles up to 5000 pounds of tools in shallow holes. Average hoisting speed of the bull reel is 375 feet per minute in high gear. The chain-driven sand reel in high gear pulls a 7 in. x 35 ft. bailer from 3000-foot depth in 3 minutes. The calf reel has a hoisting speed up to 424 feet per minute.

Fully automatic spooling saves cable by preventing piling up and pinching on the reels and means fewer delays and reduced operating expenses.

The highly portable 36-L is finding increased use on drilling and servicing work everywhere: secondary recovery operations in West Virginia and Pennsylvania; top-to-bottom-work in Ohio and Montana; trailing-in Illinois and Indiana; servicing, deepening, and swabbing as well as top-to-bottom drilling in West Texas and New Mexico. It is manufactured by Bucyrus-Erie Company.



Bucyrus-Erie 36-L With Semi-Trailer Mounting for Speedy Moves.

New Developments in High Speed Diesels

Following by 13 years the introduction of the Model H, which in 1932 became the first American-built, high speed diesel to be operated successfully in heavy-duty automotive, industrial and marine service, Cummins Engine Company, Inc., now announces the development of a new series of engines which continues the Cummins trend toward "more power per pound through high speed diesels."

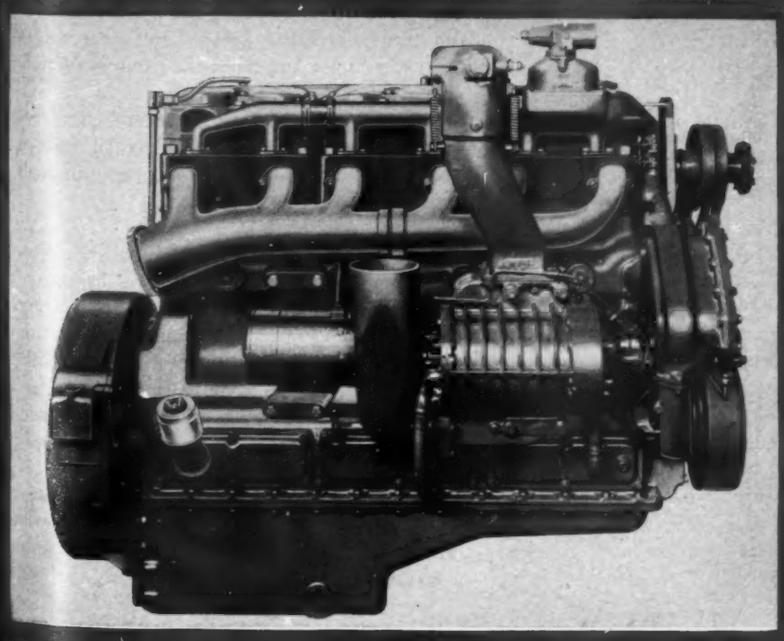
"New", perhaps, is not the word to describe the Series NH-600 and NHS-600 Cummins Dependable Diesels, because they are, in reality, merely higher speed and higher horsepower versions of the familiar Model H and its supercharged counterpart, the Model HS. The increased output of these newly developed six-cylinder engines is obtained by these three major innovations in established Cummins design:

(1) By increasing the maximum operating speed from 1800 rpm. (Models H and HS) to 2100 rpm. (Series NH and NHS).
(2) By increasing bore and stroke from 4⅞" x 6" (Models H and HS) to 5⅛" x 6" (Series NH and NHS), which increases piston displacement from 672 to 743 cubic inches.
(3) Dual intake valves are employed to provide the increased air supply needed to assure efficient combustion of the additional fuel which the engine requires in order to produce increased horsepower. Dual exhaust valves permit the rapid exhausting of gases from the firing chamber.

Comparing the 200 hp. maximum output of the NH engine with the 150 hp. of the parent Model H, it can be seen that these improvements in design have produced 33-1/3 per cent additional horsepower without appreciably increasing engine weight or dimensions. An even greater gain in horsepower (37½ per cent) is revealed by a comparison of the supercharged NHS engine with the supercharged Model HS, with 275 and 200 maximum horsepower output, respectively. Here, too, the increase has been obtained at very little cost in weight or size.

In most respects other than these listed above, this new series of Cummins Diesels bears a marked resemblance to the H line. Basic design and construction are the same. They also employ the same four-stroke cycle principle of operation; the same exclusive Cummins Fuel Distribution and Injection System; and many of the same accessories. Important, too, from the standpoint of maintenance, the easy accessibility of parts which is provided in the Model H, is also provided in the newer line.

In announcing the development of these new additions to the Cummins line, the company makes it clear that manufacture of all existing models will be continued. These include, in addition to the H and HS, a third high speed diesel, the 100 hp., six-cylinder Model A, which also is designed for automotive, industrial and marine service. This also means a continuation of the Model L, a 250-hp., medium speed engine.



Manifold side of Model NHBS, Automotive Application

New Steam Traps

THERMOSTATIC steam traps have many well recognized advantages.

In the past, the use of thermostatic traps at pressures above say 50 p.s.i. has been restricted to small equipment because flexible bellows of sufficient strength could be made only in small sizes.

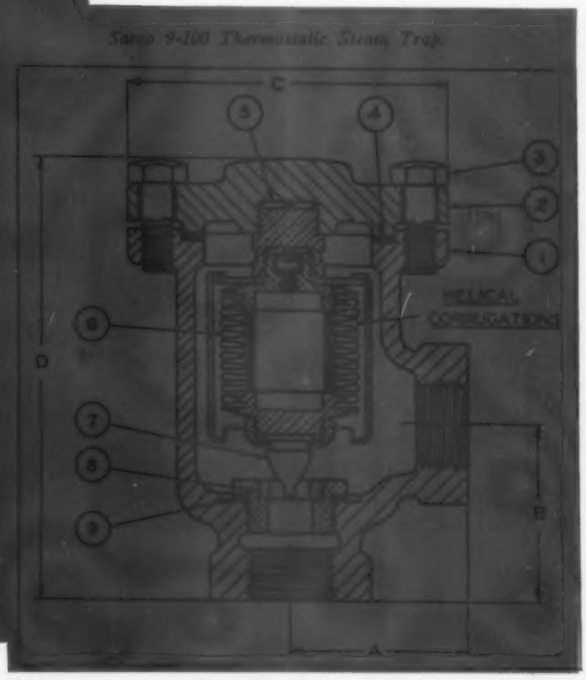
Sarco Company, Inc., has (now) announced successful manufacture of bellows from heavy wall bronze tubing, drawn and helically corrugated in their own plant by methods developed by them. These have made possible the introduction of an entirely new line of thermostatic steam traps, for pressures up to 225 p.s.i. using single, large diameter bellows, for inlet sizes ½" to 2" inclusive, and with capacities double those of the company's well known No. 9 series.

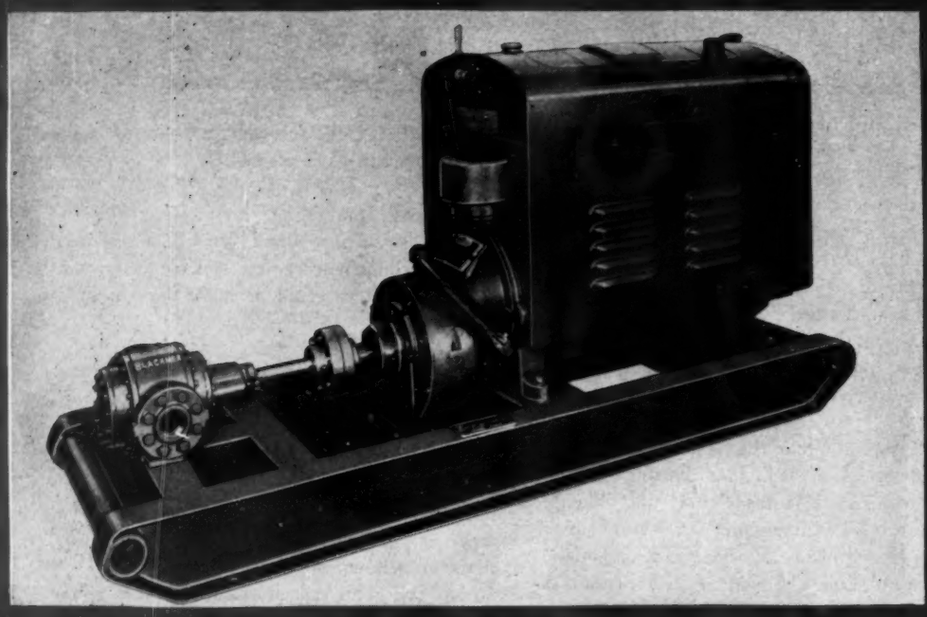
Since they work on the differential pressure between the inside and the outside of the bellows element, change in operating pressure does not necessitate change of valve seat. A given trap will work with equal efficiency at any pressure up to its maximum rating.

Due to the great lifting power of the thermostatic element, these traps have much larger valve orifices than can be provided on float or bucket types. This means several times the air venting capacity and therefore, very rapid heating up from a cold start. When installed out-doors, they need no protection against freezing.

The new traps are available in two pressure ranges, No. 9-100 for pressures 0 to 100 p.s.i. and No. 9-225 for pressures 0 to 225 p.s.i.

The construction may be gathered from the illustration. The heavy wall bellows is screwed into the end closures and the joints are sealed by brazing, using the latest electronic induction heating equipment.





Left: Blackmer Crude Oil Gathering Pump.

New Crude-Oil Gathering Pump

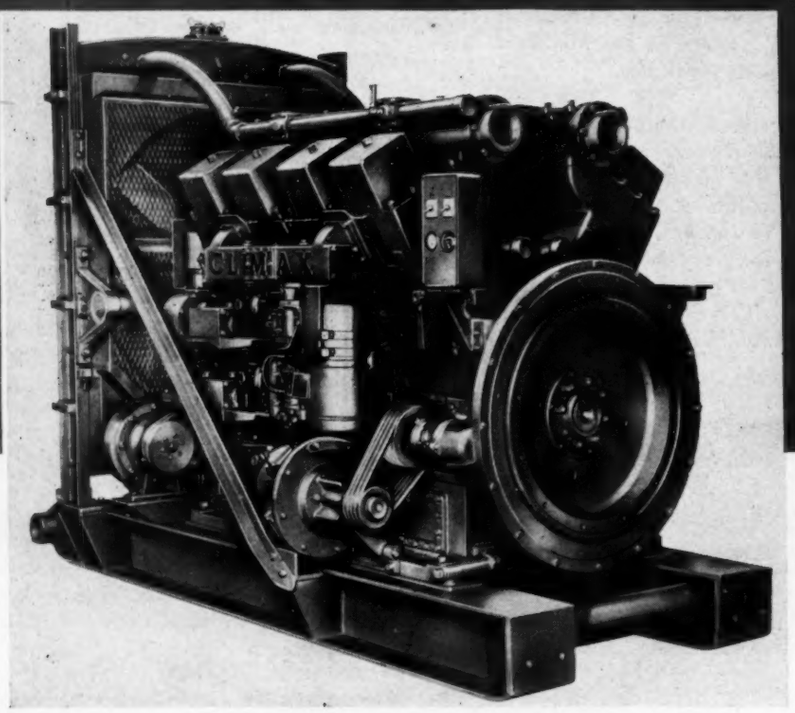
CRUDE-OIL gathering pumps are used for collecting oil from the storage tanks near the oil wells and forcing it into the pipe lines which carry it to the refineries or to the car-loading depots. They are also used as booster pumps in the pipe lines to help move the crude oil through the lines.

This service is often quite severe for a rotary pump because of abrasion from sand and corrosion from salt water and high-sulphur crudes. Because of the high pressures these pumps operate under, they are usually equipped with anti-friction bearings located near the pumping gears or rotors and which are submerged in the crude oil. The salt water, acid, and sand often cause frequent failure of the bearings. Gear-type pumps frequently lose capacity rapidly because of increasing clearances caused by corrosion and abrasion.

Illustrated is a new pump recently put on the market by Blackmer Pump Co., which has many advantages over other types. The swinging vanes, or buckets, are held against the cylinder walls by centrifugal force and are therefore self-compensating for wear. This means that nearly full capacity will be maintained until they are worn out. When they are finally worn out, they can be easily and cheaply replaced. This pump also has a removable liner and discs or end plates. By replacing the buckets, liner and discs, the pump can be restored to its original efficiency. One set of these parts ordinarily will outlast a set of gears in a gear pump.

The bearings are protected from contamination by seals. Seals are not effective by themselves against the high pressures involved, therefore pressure grooves are cored through the heads to aid the seals. These goooves are connected to the pump intake and when the pump is running with a vacuum on the intake side, a vacuum is maintained on the stuffing box and eliminates leakage through the packing. Any oil leakage through the disc is drawn into the pump through the groove.

When the pump is used as a booster with pressure on the intake side, the grooves bypass the pressure around the bearing. With the bearing cavity full of grease, a very minute leakage of oil through the seal into the bearing cavity will equalize the pressure in the bearing and grooves. This removes the pressure load on the seal and eliminates any tendency for the crude-oil to wash through the bearing. The bearing housing is provided with a grease fitting and a drain plug. When the drain plug is removed the old grease can be flushed out by forcing in new grease with a grease gun.

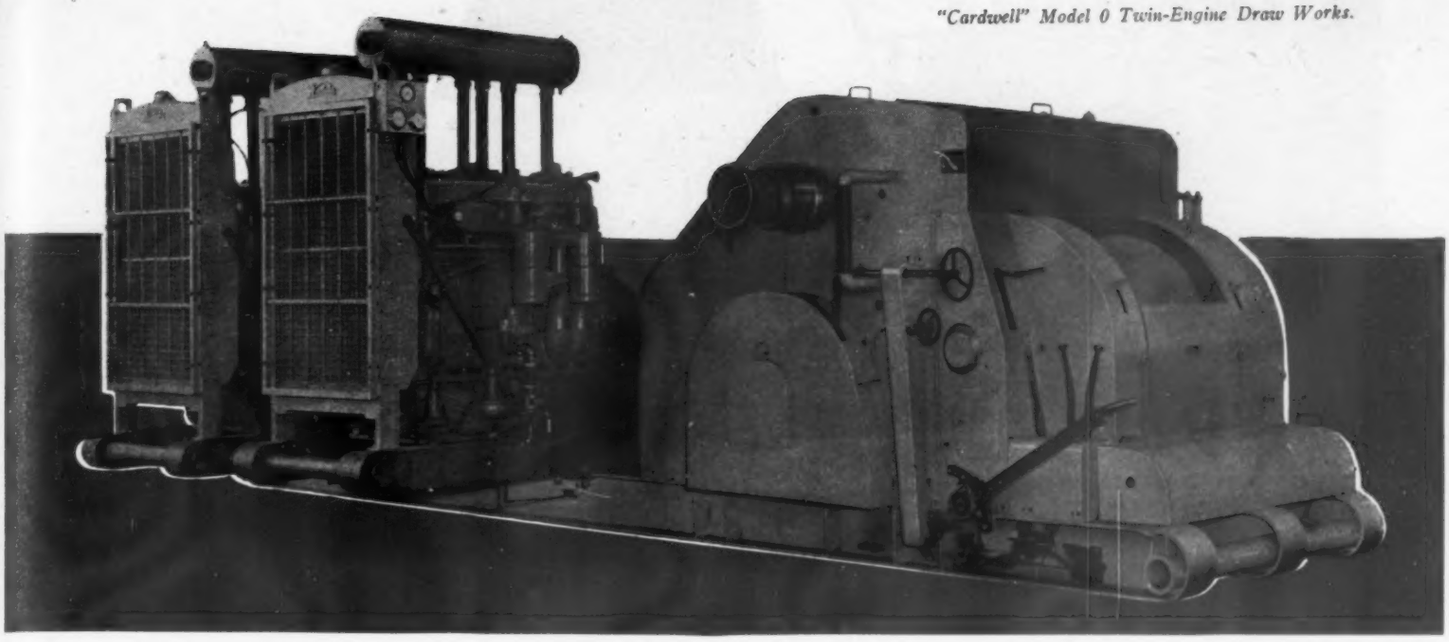


Climax Blue Streak Engine Series V-8

THE Climax Blue Streak V-8 Engine is primarily designed to power oil well drilling rigs, generators and pumps. The new, compact, heavy duty V-8 will be known as the V-330. This designation indicates it develops 330 h.p. at 1200 r.p.m. without radiator and fan, but with all accessory equipment. As a drilling engine, it will be known as the VU-280, developing 280 h.p. at 1100 r.p.m. with radiator, fan and all auxiliary equipment.

These Climax valve-in-head Blue Streak V-8 Engines are 8 cylinders, 4 cycle, with 6½" or 7" bore, 7" stroke. The valves are located in the cylinder head and there are two cylinder banks of 4 cylinders each, 60° apart. They are quick starting, smooth running, dependable and flexible prime movers. This V-8 is built to take the hardest kind of industrial or field service for mobile or stationary equipment. This simple, well balanced design promotes high mechanical efficiency and the heavy reinforced construction insures the user many years of service.

The V-8 drilling engine is equipped with the Climax all weather, belt connected "Air Start". It operates on gasoline, butane, by-product or natural gas. It runs at slow, minimum wear speeds, at low, safe temperatures in all climates on very little water.



"Cardwell" Model 0 Twin-Engine Draw Works.

Twin-Engine Draw Works

THE "Cardwell" Model O twin-engine draw works is a heavy-duty drawworks with 450 horsepower input, and is recommended for drilling to 8000 feet with 4½-inch drill pipe or workover jobs to 15,000 feet, and has the following special features:

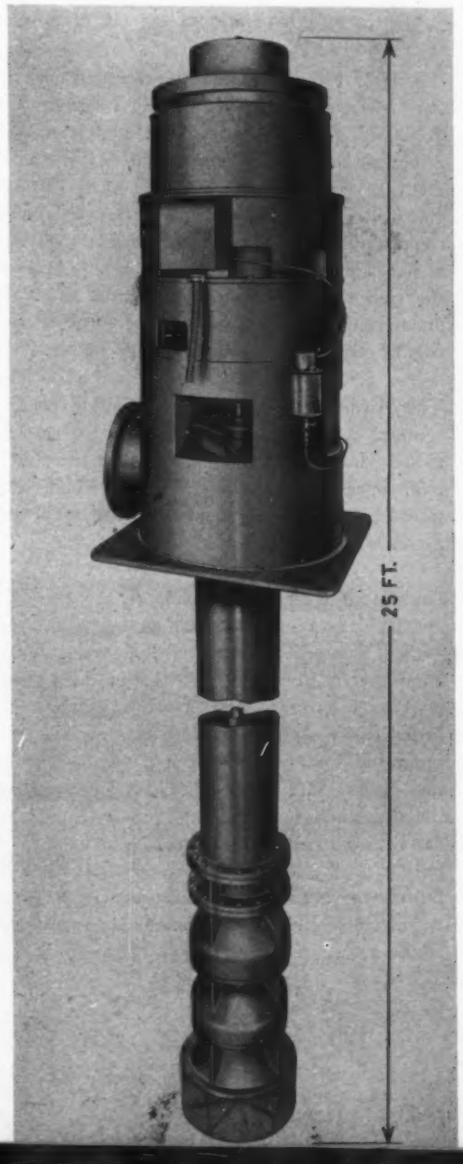
Manually controlled Twin Disc friction clutches drive the pump, draw works, and rotary table. Either or both engines may be used to drive the draw works, rotary table, or pump. Engines are fully synchronized and quickly adjustable from driller's position, with all other controls within easy reach.

The "Cardwell" chain transmission has three speeds forward and one reverse. Pumped oil lubrication is provided to all chains and bearings with oil pressure gauge in front of the driller. Dual drum drives provide six speeds forward and two reverse to the lower drum, with all hoisting speeds instantly available.

When rotating, no drives are running except to the rotary table, although catheads or drum may be engaged without stopping rotary table or slush pump. The rotary table operates from transmission with three speeds forward and one reverse, through a twin disc friction clutch with automatic brake to quickly stop rotation of table. Rotary table speeds range from 70 to 220 RPM. Rathole drive sprocket is built into the draw works.

Hydromatic brake is available for installation on lower drum shaft. Single adjustment, fully equalized braking system is available with either circulating water or spray cooling system. Braking system without hydromatic brake will hold 6,500 feet of 4-½ inch drill pipe with six lines up.

Draw works may be moved over highway without special permit, by removing engines and catheads. It is not necessary to remove bearings to take off the V belt engine drives.



Pacific's New Vertical Turbine Pump.

Vertical Turbine Pump

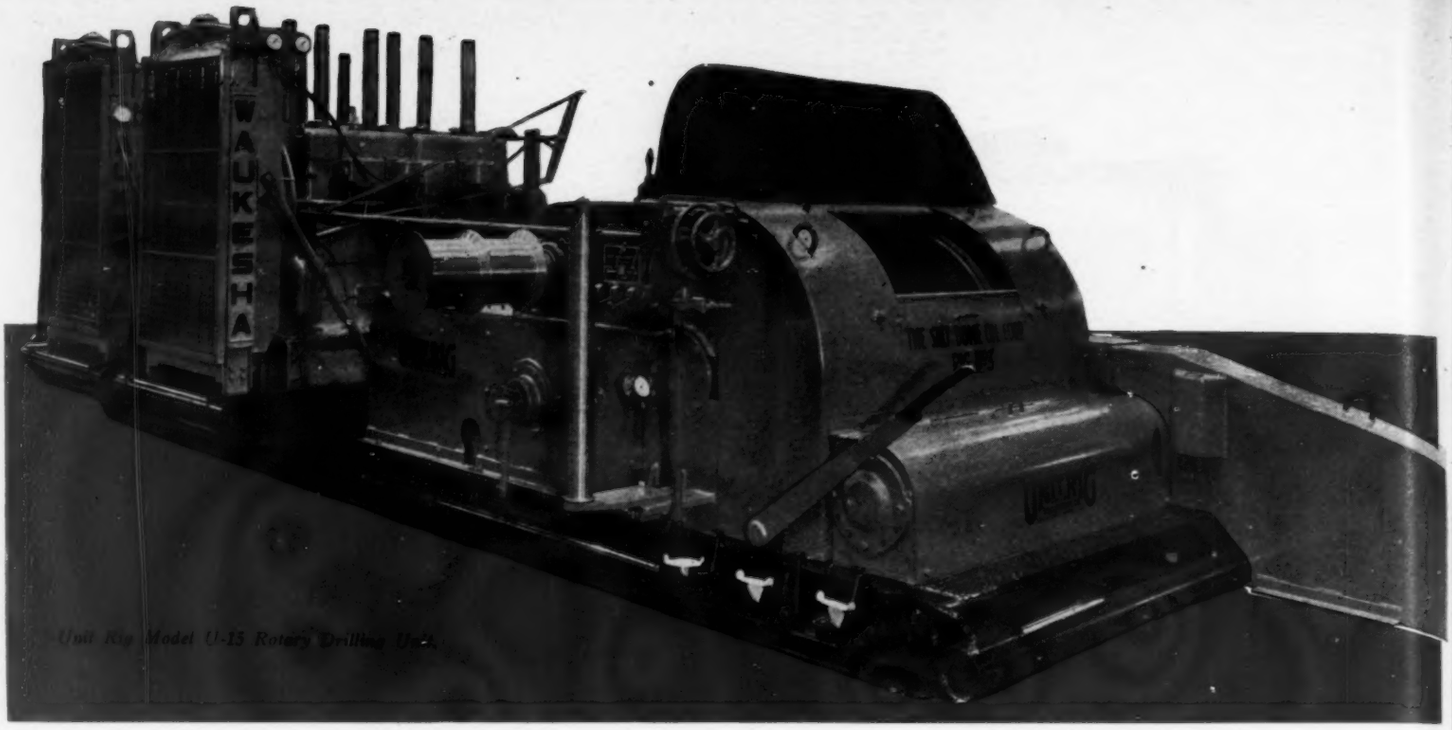
A new vertical turbine pump for industrial use with capacities ranging from 50 to 15,000 gallons per minute, has been announced by Pacific Pumps, Inc.

This latest unit of Pacific's line is manufactured in any number of stages, so that a given size of pump can cover a wide range of head by simply varying the number of stages. It is available to fit inside casings from 6" to 36" in diameter and to operate at speeds up to 1800 R.P.M.

Applications for the new Pacific pump include circulating water for refinery cooling towers, pumping oil for heat treating plants, pumping gasoline from underground storage tanks, dewatering mines, and low, medium and high head installations requiring vertical pumping equipment in such fields as irrigation, municipal and industrial water supply.

The discharge column is produced in any length desired; an outside pipe carries the liquid from the pump proper to the discharge head at the surface and also provide supplementary support for the pump. A line shaft on the inside of the pump, completely encased in a protecting tube, connects the driver shaft with the pump shaft, effecting transmission of power to the pump.

This pump features the following advantages: Permanently packed lower bearing provides lifetime lubrication. Increase or decrease of lift or discharge pressure necessitated by varying pumping conditions, is obtained by simply adding or removing stages. To accommodate lowering liquid levels, height of column may be increased by removing discharge head and driver only.



Unit Rig Model U-15 Rotary Drilling Unit

New Rotary Drilling Unit

THE Unit Rig Model U-15 rotary drilling unit has a rated drilling depth of 7500 feet with 4½" drill pipe. It is a six-speed friction clutch controlled unit which supersedes Unit Rig's Model U-10 "Spitfire".

Each unit is equipped with two compressors, one to an engine. The drawworks and the transmission are in the same housing, which is welded to the same base, on which the engines with the compound system, are mounted. With this arrangement, the entire assembly, in most cases including engines, can be transported in a single load ready to operate when set on location.

Special care has been taken to lessen adjustments. The Air-O-Matic friction clutches on the drum drive, rotary table drive and the pump drive are non-adjustable, and the improved brakes have only one adjusting point which is self-locking and easily accessible.

The U-15 is equipped with a foolproof oil bath and spray system, including a filter unit, which serves the compound transmission and drawworks. The whole oiling system is intercommunicating. It is also equipped with a six-speed chain type transmission, giving six speeds in logical order, all of which are available for the rotary drive or for the drum. At customer's option two of the forward speeds can be converted to reverse speeds. All speeds are instantly available through Unit Rig's flexible speed controls, requiring only one lever. The Air-O-Matic clutch pump drive, as well as all of the engine coupling clutches, are controlled at the driller's position.

The U-15 is equipped with Unit Rig's patented compound drive arrangement, permitting the use of two or more engines, the power from which may be distributed between the slush pump and the rotary table, or combined for operating the hoist.

The U-15 is also equipped with Unit Rig's patented cathead, which does not increase the overall width of the unit.

The U-15 pump drive pulley is equipped with an Air-O-Matic friction clutch. This clutch was developed for oil field service, and is of the direct air actuated type that can be controlled from the driller's position. The Air-O-Matic clutch has only one moving part, and is self-compensating for wear. There are no adjustments, and the clutch in operation will pick up the load smoothly. With this clutch the mud pump load does not impose severe shock on the engine, transmission or the pump gears.

The Airflex Clutches, also of the direct air-actuated type, are used for coupling the engines to the Model U-15 compound; when the clutch is disengaged, there is no mechanical connection whatever between the engines and the compound driven shafts.

Aside from these improvements there is one that is completely new in the field of rotary drilling —the driving of a high speed hydromatic brake from the drum of the drawworks. The brake is mounted on top of the drawworks case; it adds little weight to the unit, but does not increase the overall width. From the standpoint of operation, it has better operating characteristics than the larger direct coupled brakes in that the brake has little resistance at the initial starting of the falling load. As the block speed accelerates in falling, the brake absorbs the braking energy at an increased rate (approximately proportional to the square of the velocity). The brake serves as an excellent governor of the drum speed. Drillers appreciate the fact that there is little to do in the way of controlling the hydromatic brake. It serves at its own pump, and to control the rate of fall of the block—it is only necessary to regulate a valve in the inlet water line. Drillers have repeatedly mentioned that there is no appreciable drag in elevating the blocks with this brake.

Time Controller for Wax Presses

TO assure uniform quality of product, most batch processes require the accurate repetition of a predetermined program involving time coupled with temperature, pressure, flow or liquid level. For this purpose, the Taylor Instrument Companies manufacture a Time Schedule Controller about which they have recently published an 8-page descriptive bulletin.

These instruments are of special interest to the petroleum industry where they are used extensively on wax sweaters.

The bulletin referred to is liberally illustrated with photographs showing actual applications and covers such topics as:

1. How a control schedule is accurately repeated time after time.
2. How auxiliary functions can be accurately synchronized with control of the main variable at any point in the processing cycle.
3. How processing schedules can be easily changed as to time and variable control.
4. How to select a Taylor Time Schedule Controller.

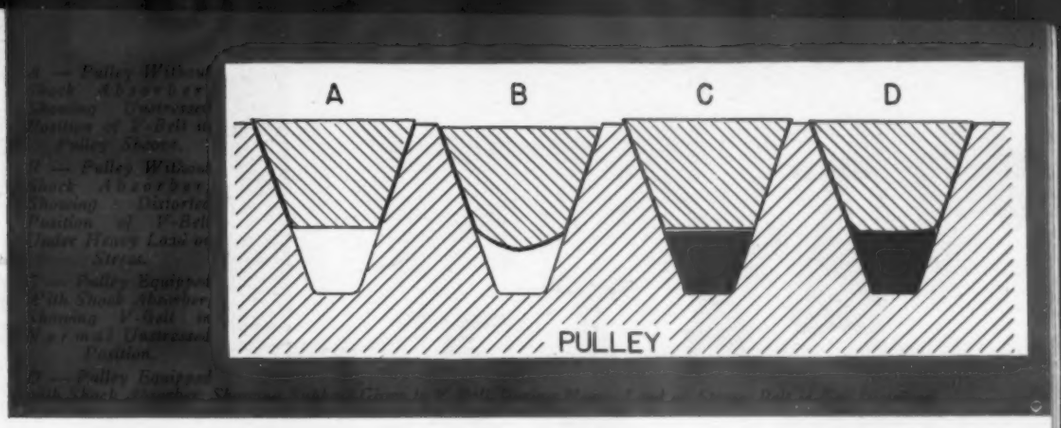
The Tournapull

THE name appearing in the above caption is applied by R. G. Tourneau, Inc., manufacturers of heavy grading equipment to a small bulldozer. Complete with power unit, and 2.3 yard carryall scraper that is easily transformed to crane or truck work, and which can travel at speeds up to 16.1 miles per hour. The Model D Tournapull outfit is operated by one man, and was designed to meet the demand of the armed forces for a prime mover small enough to be stowed in a transport plane and work fast at clearing and grading for immediate military operations, do lifting jobs, etc., and be quick and handy at all such tasks.

It is self-loading in most materials. A pusher block is provided on the scraper for boosting in tough, unbroken rocky materials. It not only loads itself, but hauls and spreads its own loads without calling for help from auxiliary loading, hauling or spreading equipment. It will move as much or more dirt than a 70-80 D.B.H.P. tractor and dozer on hauls of 200 feet, and more on longer hauls. It has the same rugged design, positive ejection tail gate and independent apron control as the big carryalls now in the field. The manufacturer says he believes that it will move more dirt than anything its size or price now on the market. A rooter point attachment can be mounted on the carryall blade for breaking hard rocky material for easier scraper loading. It is powered by a 44 H.P. engine at 3000 R.P.M. The two-wheel design of the Model D Tournapull concentrates the weight on the big tires to give the greatest possible traction.

The scraper is easily disconnected and the Tournapull prime mover converted for hauling or lifting. As a hauling unit, the Model D Tournapull easily handles an 8000-lb. load. When used for crane work it has a lifting capacity of 4000 to 10,000 lbs, depending on the crane model. The crane folds down out of the way for traveling or for compact shipment.

It is more versatile in its way than the famous Jeep, and should prove its worth in the grading, excavating, road marking, hauling and lifting work that has to be done in the oil country.



V-Belt Shock Absorbers

BAROID V-Belt Shock Absorbers are rubber fillets made to fit the bottom of pulley grooves so as to provide firm but resilient cushions for V-belts. These Shock Absorbers support the belts when undue stress or load tends to pull the latter deep into the sheaves. Thus they check distortion breakdown and provide more efficient belt operation and are distributed by Baroid Sales Division of National Lead Company.

Baroid V-Belt shock absorbers fit the pulley groves under sufficient tension that centrifugal force generated by pulley rotation will not displace them.

In normal even pull the belts may not even touch the Shock Absorbers. However the work imposed upon most machines makes them change constantly between lag and pull. This tension change may occur several hundred times a minute. The transmission gearing constantly, takes the stress of uneven loads in such machines as oil well pumping units, crushers, and compressors. A V-belt without a shock absorber flexes and cups into the pulley groove under the sudden stress or shock imposed by the change from lag to pull. Such belt distortion creates severe stresses within the belt structure which tend to pull it apart or crack it open. This resembles the breaking down action in the side walls of an under-inflated tire. Distortion breakdown occurs even with the proper number and size of belts for a particular load. Overloading increases the rate of the deterioration.

A V-belt equipped with a Baroid V-Belt Shock Absorber cannot be unduly flexed by uneven load or heavy shock. When the belt tends to cup into the pulley groove it meets the firm but resilient shock absorber, which completely fills the bottom of the pulley groove, and the belt rides slightly lower but evenly in the sheave, exerting a uniform pressure on the side walls. The undistorted contact between belt, pulley, and shock absorber reduces slippage and provides maximum pulling power. V-belts can be run looser with Baroid V-Belt shock absorbers, thus prolonging the life of not only belts, but of pulleys and bearings as well.

Portable Light and Power Unit

THE Da-V-Lite portable light and power unit, shown herewith, manufactured by the Davey Compressor Co., solves the problem of light and power on thousands of jobs—construction projects, utility emergency repairs, mine operations, logging, quarrying, airfield-lighting—wherever dependable light and power are needed.

A heavy-duty, four cylinder, V-type, air-cooled engine operates a Westinghouse single-phase, 60-cycle, 120-volt generator delivering 5 KW for lighting or power.

The Da-V-Lite is available in four models, any of which may be obtained with either skid mounting or spring mounted on two wheels.

Power unit on all models is enclosed in sheet-steel, weather-proof body. Illuminated Westinghouse control panel makes operation safe and trouble-free. Two 30-amp double receptacles for operating power tools are furnished. The Da-V-Lite is distributed nationally by Westinghouse Electric Supply Co.

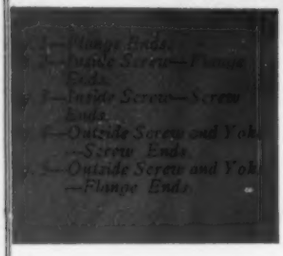
Fig. 1

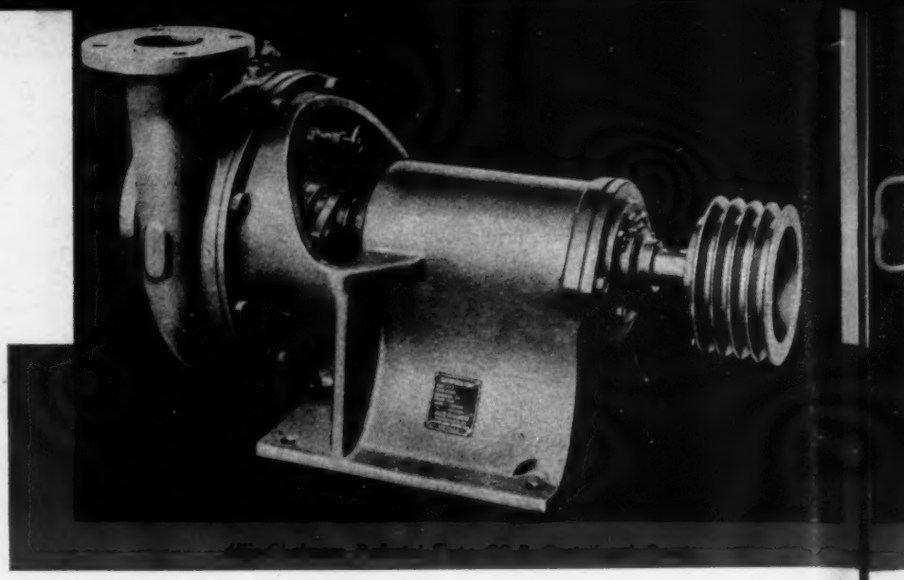
Fig. 2

Fig. 3

Fig. 4

Fig. 5





New Darling Valves

CAST Steel Swing Check Valves and Iron Body, Wedge, Taper Seat Gate Valves are two new series recently added to the extensive line of valves of many types and sizes produced by the Darling Valve & Manufacturing Company. The new valves, like many other Darling Valve types, are designed for use in oil and gas pipe lines, power plants, oil refineries, and similar services.

Cast Steel Swing Check Valves

These new valves, from 150 lb. through 600 lb., and in sizes graduating from 2″ to 12″ inclusive, embody many advantageous features, are available in various cast steel compositions. The valve disc, free to revolve fully, takes a different position on the seat ring at each closing, assuring uniform distribution of wear over the entire seating surface. Vertical seating surfaces permit sensitive action, yet without differential pressure the valve disc remains tightly seated as the clapper arm pin is set slightly back of the vertical seating surfaces. The bronze or alloy seat rings are screwed into the body and can readily be replaced while the valve is in the line. Generous elliptical bodies provide excess area through the valves and assure full delivery of line capacities.

Iron Body Taper Seat Wedge Gate Valves

These new Darling gate valves are available in bronze and alloy mounted or all-iron construction. The recommended service pressure for steam is 125 lb. in all sizes; for oil, water, gas and air, 200 lbs. in 2″ to 12″ sizes and 150 lbs. in the 14″ and 16″ sizes.

The bodies and bonnets are made of high duty Darvaliron with generous radii on all curved surfaces to provide extra strength. Stems in the bronze mounted valves are extra large and made from special high strength Daraloy manganese or aluminum bronze.

Double Disc Parallel Seat Gate Valves

Another type of Darling gate valve is the unique Double Disc Parallel Seat Valve, available with iron, bronze, cast and forged steel bodies in a complete range of sizes and types and with mounting or trim to meet all requirements.

This type of valve is particularly immune to all kinds of punishment and distortion due to its free-floating, fully revolving discs and upper curved-face wedge. Out-of-line or unparalleled seat conditions are compensated for automatically to retain drop tight seating and positive closure regardless of either length of service or prolonged distortion. The gate assembly consists of only four parts, two discs and two wedges. The gate is lowered into the body until the discs are opposite the seats. The wedges then spread, forcing the discs into a tight, contact fit without friction. Since the fully revolving discs take a different position at each closing, wear is uniformly distributed to further assure long life, low maintenance and positive, leak-proof action.

Darcova Pumcups and Pistons

Darcova pumcups utilize a radically different principle from the ordinary types of pump packing. Constructed of an exclusive composition in the form of a cup, fluid pressure keeps the Pumcup sidewall in close contact with the pump liner regardless of wear. Thus fluid slippage is held to a prolonged minimum. On the return stroke, side-wall pressure is automatically released, reducing the load. The Pumcups are made in three textures, hard, medium and soft, for various pressure and abrasive conditions, and are available in a complete range of sizes.

Pistons for Darcova Pumcups are made up of three parts, the bodies, spacers, and followers. Regularly furnished in either high strength Darvaliron or bronze, the pistons are made to fit either tapered or straight piston rods. When used on tapered rods, accurately machined bores provide strong fluid-tight seals between rods and pistons. Pistons are designed and manufactured to close working tolerances to obtain maximum pumping efficiency when used with Darcova Pumcups.

Pedestal-Mounted Centrifugal Pumps

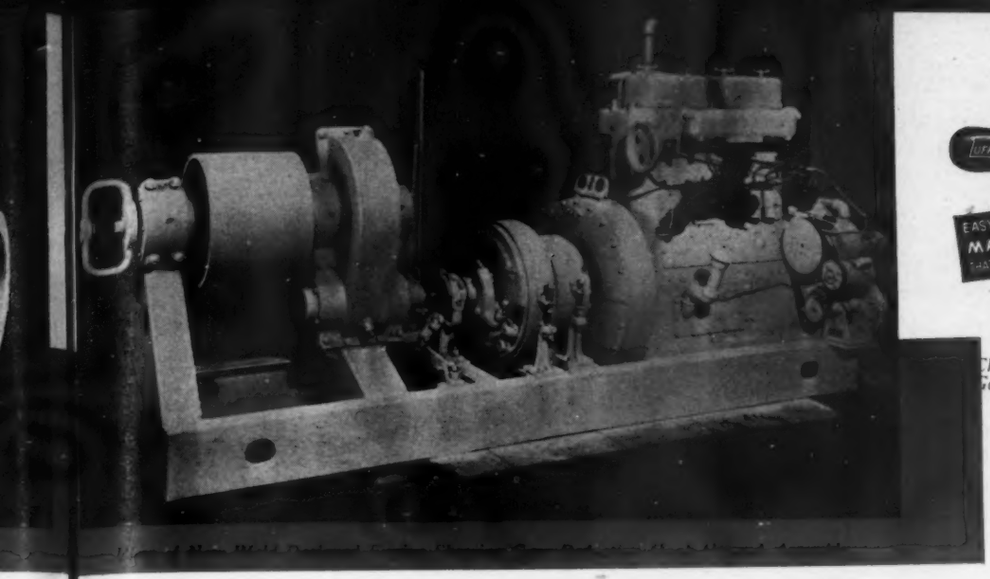
THESE versatile SS-B single suction base mounted pumps have hundreds of important uses throughout industry. They can be driven by electric motors, steam turbines, gasoline or diesel engines . . . direct connected or through Texrope v-belts or flat belts. They are used for widely diversified uses from irrigating farmland to handling chemicals.

Except for the supporting pedestal, SS-B pumps are identical in construction to the famous SS-Units originally developed by Allis-Chalmers to provide low cost pumping . . . plus high efficiency and dependability. SS-B pumps were developed for use where close-coupled motors were not practical.

SS-B pumps are mounted on substantial pedestals which have two ball bearings for supporting the pump shaft. The liquid end of the pump is a complete self-contained unit so that it may be made of stainless steel, monel metal, nickel, or other special materials when used for pumping liquids which would attack iron or bronze. They are built in a wide variety of sizes.

Resinous Compounds for Oil Well Sealing

WILMINGTON CHEMICAL CORPORATION, in collaboration with the Synvar Corporation, announces the availability of a resinous compound, developed especially for sealing oil wells. The new product, known as Synvar Oil Well Sealing Compound, provides a water-and-oil resistant seal, and forms an integral and uniform structure with rock formation and pipe. A minimum of shrinkage is assured, and the new compound can be used at any practical temperature. The product is supplied in separate components which are combined just before use, with the proportions of the different components adjusted to suit existing well conditions.



Atlas Chrome Clad Gaging Tape.

Chrome Clad Derrick Tape.

New Oil Field Welded Engine

AN outstanding example of the benefits that are made possible through changeover to welded design is shown in the new all-welded gasoline engine for oil field service, illustrated in the accompanying photograph, which has replaced the previous type engine of heavy cast iron construction.

Over 25 percent less weight, lower initial cost, easier portability and lowered maintenance are some of the principal advantages of the newly designed engine.

The redesigned power unit is a four-cylinder type operating on either natural gas or gasoline and is used for drilling oil wells by the cable tool method. The engine is operated at a speed of approximately 500 revolutions per minute when drilling and 1500 revolutions per minute when bailing a well or pulling tools. The unit has a rating of 120 brake horsepower at 1200 revolutions per minute. Cylinder bore is 4⅞ inches with a stroke of 7 inches.

According to the manufacturer (Buffalo Gasoline Motor Company), welded construction offered them manufacturing advantages that eliminated costly foundry delays and expensive pattern making and maintenance. Changes in design can be made more cheaply and quickly. More raw stock can be stored in less space than by casting methods. The change to welded steel construction lowered the cost and the surfaces required less smooth-on, filler and cleaning before painting.

As considerable oil field drilling is done in rough and mountainous terrain light weight is essential for rapid transportation and installation. This obviously reduces non-drilling time and increases the pay time. The engine is either mounted on wheels or on skids.

The newly designed engine, which has an all-welded steel crankcase, engine block, manifolds, base and gear reduction case, has withstood many months of severe field service where it has operated continuously, 24 hours per day for periods of from 30 to 60 days. The engine has proved so successful that the company is planning a long range production program involving new similarly designed all-welded oil field engines including six, eight and twelve cylinder sizes.

New Air Control

THE announcement of a new simple rugged, durable, dependable air control for shallow well pumps is made by Manning, Maxwell & Moore, Inc.

In placing this new Ashcroft Air Control on the market, the manufacturer announces many features exclusively Ashcroft. They include rubber diaphragm as the one single moving part which combines valve head, gland seal, and float hinge. The valve has stainless steel orifice and is completely sealed. It has no water cavities. Body is either cast brass or cast iron. Unit is compact, light weight, measuring 1¾" between wrench flats. Control is for applications up to 80 lb. PSI tank pressure.

An illustrated descriptive folder giving all details as to application etc., is available.

Chromium Plated Tapes For The Oil Industry

THERE are innumerable situations in which it is necessary to gage the contents of oil tanks. This is rough work—for tapes made of any material that is subject to rusting or other form of deterioration. Another circumstance which the gager has to contend with is the difficulty of keeping the tape clean enough to be able to read the marks, which have a tendency to become obscured.

The Lufkin Rule Co. has come on the market with a chromium clad steel tape that is said to be both durable and easy to read. The tape is a very flexible thin strip ½ inch in width. The silvery satin white color of the chromium-steel surface furnishes a strongly contrasting background for the black figures and scale markings in feet, inches and eight-inches. This lettering, like the chrome clad steel itself is non-corrodible and resistant to oil.

For the use of drilling crews the Lufkin Rule Co. also offers a chrome clad derrick tape for measuring casing standing in a derrick. This tape is ¼ inch wide and is extra strong, being built up by plating. All fittings are sturdy, hence the tape has the durability required in the oil fields and handles nicely. Even in a high wind or from an unfavorable position it can rapidly be set on pipe, and as zero falls inside of hook accurate measurement is quickly obtained.

Anti-Corrosive Coating

MUCH of the equipment of an oil refinery is in the form of piping, iron sheets and plates, stocks, etc., which are often subjected to the toughest conditions of high temperature, constant exposure to weather and to corrosive fumes. Protection and conservation of these surfaces is an important element in maintenance, and an assurance against rapid deterioration.

The Wailes Dove-Hermiston Corp. is now offering a unique coating called "Bitumastic Hi-Heat Gray" which when ready to use, is a paint weighing 19 lbs. to the gallon. The material comes to the user in two containers, one holding the vehicle and the other powdered zinc metal. These ingredients are to be mixed on the job.

The vehicle contains ingredients that prevent oxidation of the zinc at high temperatures, and promote a "fusing" effect of the zinc, resulting in a lasting metallic bond on the steel. The protection afforded against corrosion is approximately the equivalent of metallic zinc. This coating resists high heat up to 1200°F. It is therefore ideal for surfaces. It is claimed that extensive tests and observation have shown that under extreme conditions Bitumastic Hi-Heat Gray protects long after other paints disintegrate.

Emsco J-1250 Drilling Rig

THE complete drilling rig consists of a hoisting unit or draw works, a selective three-speed forward and reverse transmission, a compounding transmission, engines, slush pumps and the necessary steel mounting members. The hoisting unit and the selective transmission comprise the draw works.

The draw works has six hoisting and three rotary-drive speeds, with two reverse speeds to the drumshaft and one for the rotary. The frame has an over-all length of 22 ft. and a width of 8 ft., with foot pedals removed.

The selective transmission is an independent unit. It can be set at any desired level between the hoisting unit and the compounding transmission. This adapts the rig to difficult well locations, eliminates the necessity of breaking down the draw works for transportation and permits a high degree of flexibility in rigging up.

Disk type air-operated friction clutches are employed on the drum low, drum high and rotary drives. In addition to the air-operated friction clutch on the drum low, an emergency positive spline clutch, operated from the driller's position, is provided in case of an extreme load or failure of the air supply.

A gear tooth clutch is mounted on the lineshaft to control the low drum drive and catshaft. When drilling, this clutch may be disengaged to allow the catshaft and low drum drive to remain stationary.

The master disk clutch and neutral brake are primarily for the selection of speeds in the selective transmission and, in combination with the visual speed indicator at the driller's position, allows the transmission clutches to be shifted at the proper speeds.

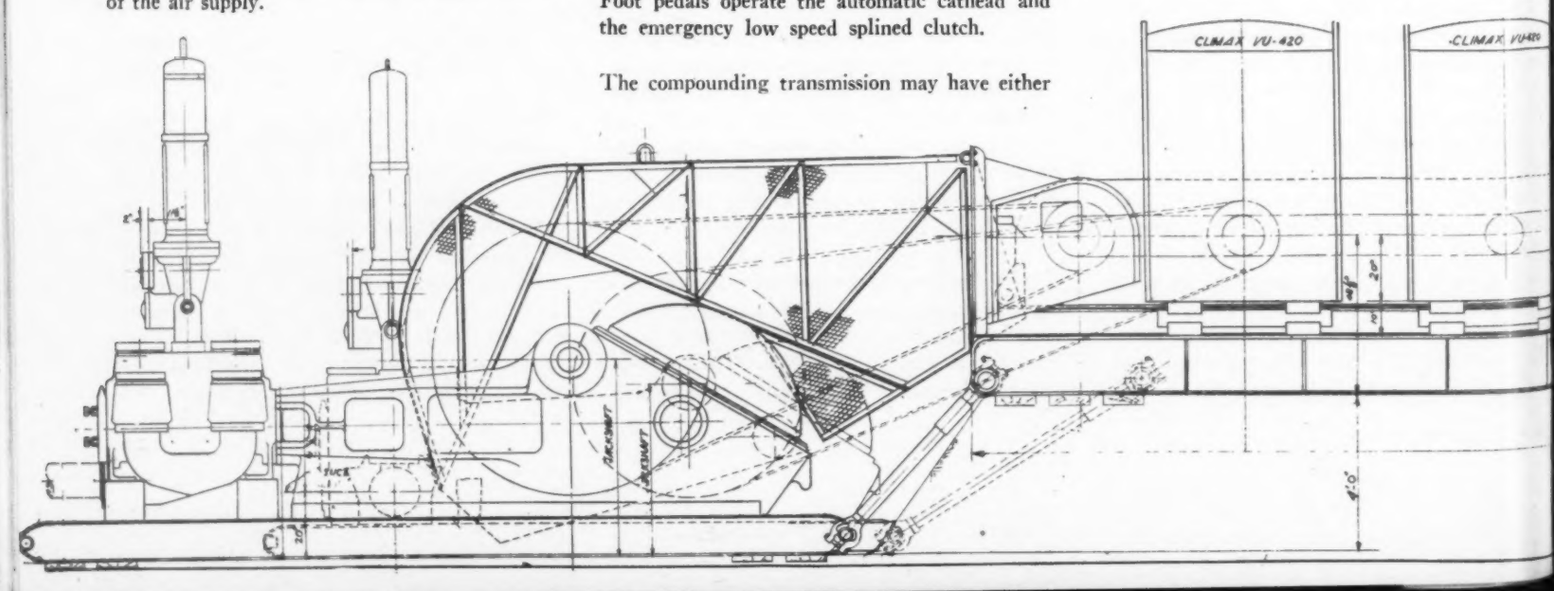
Variable pressure valves control the friction clutch operation. Air pressure is supplied by a compressor mounted on the compounding transmission and stored in a reservoir at 125 lb. pressure.

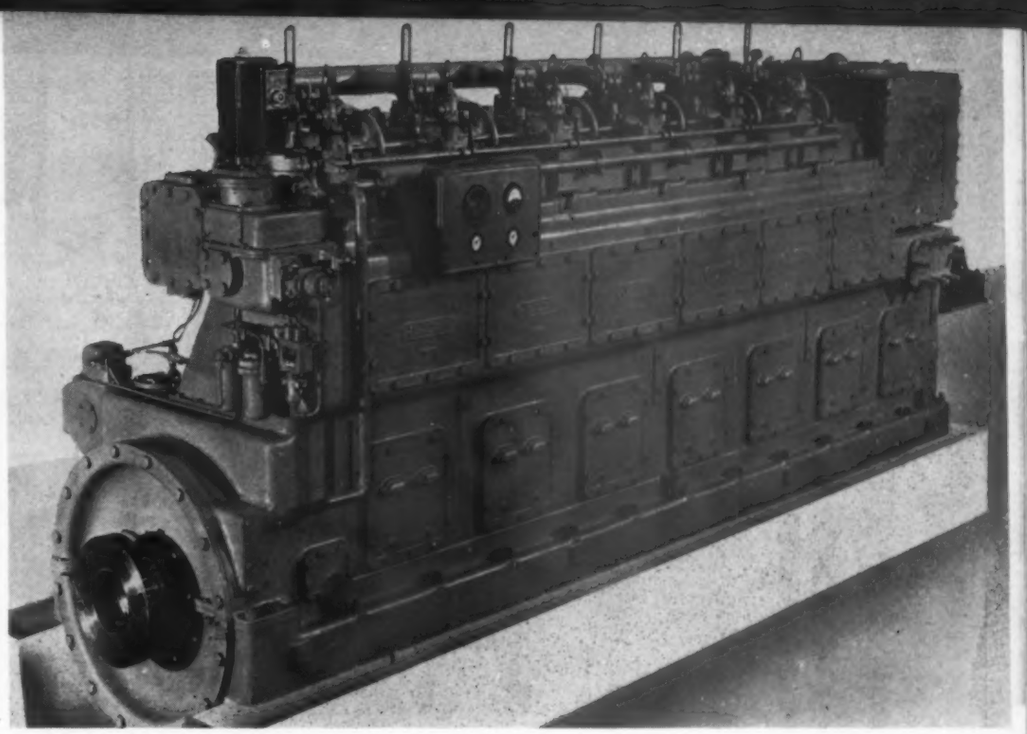
Hand-operated variable pressure valves control the friction clutches and are used in conjunction with an independent foot operated throttle. One control lever operates the low and high drum friction clutches, another operates the rotary friction clutch and a third controls the master clutch and brake. A hand lever is provided for shifting the lineshaft clutch. Another hand lever controls the two clutches in the selective transmission. Foot pedals operate the automatic cathead and the emergency low speed splined clutch.

The compounding transmission may have either two, three or four shafts and is for use with two or three engines. The slush pumps are driven from the rear engine shaft and from a separate pump drive shaft, through friction clutches and V-belts. This arrangement allows the pumps to be driven separately, in parallel, or compounded.

The main draw works brake is the full wrap, self-energizing type. Brake toggles are roller-bearing equipped. An equalizer is located on the live ends of the bands. Each band has 12 brake blocks, 1¼ by 9 by 12 in. The brake lever is equipped with a friction locking device which enables the driller to set the brake to "feed off" smoothly or to hold a load. A centralized lubrication box is provided. Brake rims are bolted between two flanges in double shear. Brake rim flanges allow the brake rims to be removed without disturbing the drumshaft clutches, sprockets or bearings.

A cradle is provided on the rotary side for mounting the hydromatic brake. A multiple jaw clutch on the brake shaft engages jaws on the splined hub of the rotary idler to allow close mounting of the hydromatic brake to the draw works.





Clark Model D. G. 2 Cycle, Stationary Diesel— 6 Cylinder, 570-750 BHP.

Controlling Corrosion

POSITIVE control of corrosion by air drying plastic coatings is now possible, according to Oil Trading Company. Exterior coating films have been developed which are unaffected by exposure to petroleum products or vapors, dilute mineral acids or alkalis, such as hydrogen sulphide, sea water, salt in air, or solution, oxidizing agents as nitric or chromic acids: they are non-conductors and therefore, prevent electrolytic corrosion; they have a high degree of ductility, excellent abrasion resistance. Being fireproof, they will not support combustion, effectively prevent corrosion for long periods, are applied in same manner as paints and fall in the same price range. Interior coatings have the same characteristics and remain unaffected by crude oils, gasoline, distillates and other fractions of lower than 30% aromatic content.

Clark 2-Cycle Gas Engine Driven Compressor

DURING the past winter, Clark Bros. Co. Inc., have placed in production a new right angle, 2 cycle engine and compressor with many striking features.

Cataloged as the Clark Model B.A., it is the most compact heavy duty unit ever built for the power delivered. Built in 5, 6, and 8 cylinder sizes, the B.A. units are rated at 1000, 1200 and 1600 B.H.P. respectively or 200 B.H.P. per cylinder. A single exhaust pipe can be used at either end of the exhaust manifold. All parts are sufficiently heavy to permit direct conversion to full diesel. The power piston is 2 piece with steel head and ring carrier and cast iron skirt. The steel cylinder heads are clamped in place by a heavy cast iron head to allow free expansion of the head. Spiral water cooling on both cylinder and head gives high velocity forced circulation of water for maximum cooling. The water and oil inlet headers are built in.

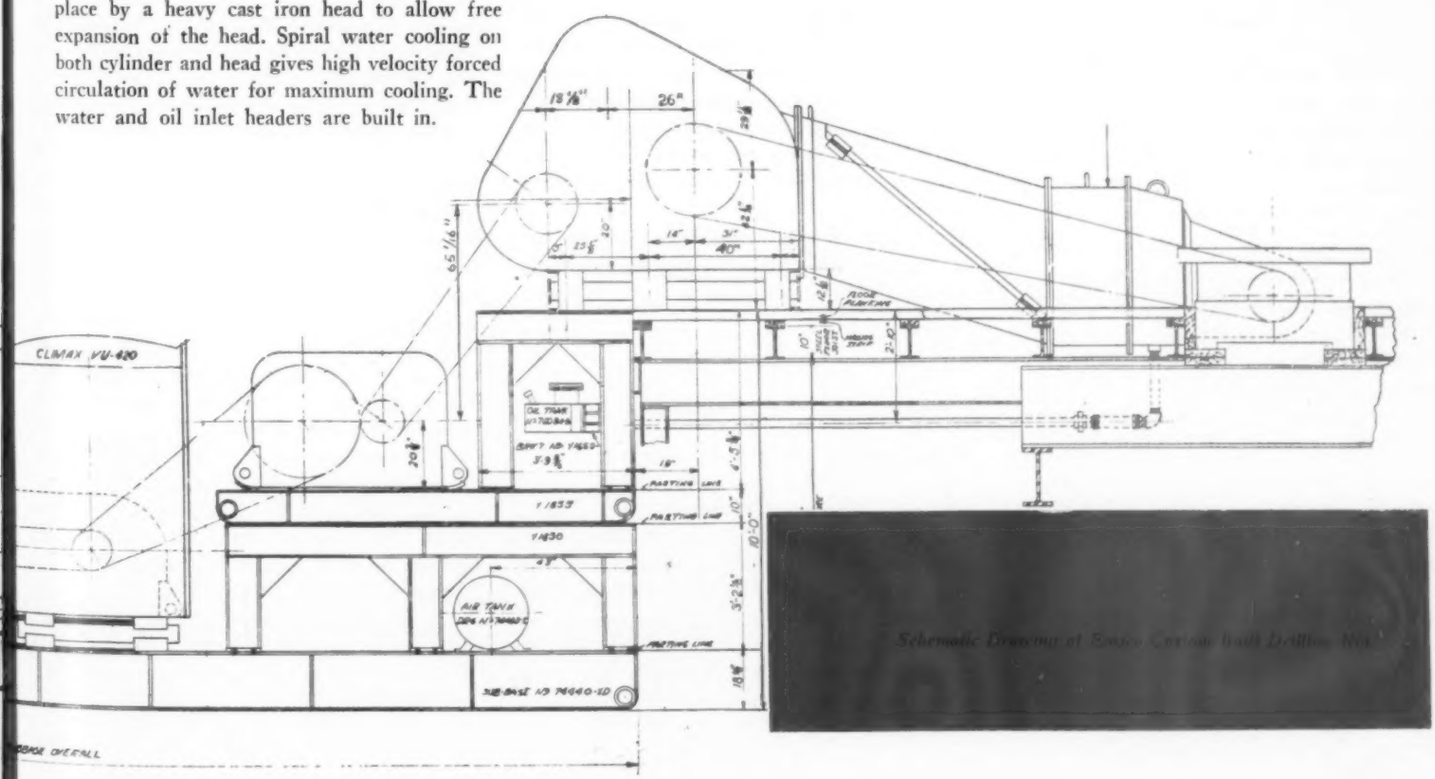
New Clark 2 Cycle Diesel Engine

A new addition to Clark Bros. line of 2-Cycle stationary Diesel engines is the Clark Model D.G. Series for pump, generator and industrial services. A number of these have been built and shipped in recent months.

To meet the necessity prevalent today of using relatively unskilled operators to service diesel engines, the Clark engineers designed the D.G., with extreme simplicity of construction and easy accessibility of all parts. The power cylinders and the scavenging cylinder are arranged vertically and in line. Maximum ruggedness of construction is also an outstanding characteristic of the D.G. All modern features, some of which are oil cooled pistons, high velocity forced circulation of cooling water, direct fuel injection and "Porus-Krome" hardened, super charged power cylinders have been incorporated into the design.

The Clark Model D.G. Diesels are built in the following sizes and BHP ratings.

Type	No. of Cylinders	B.H.P.	R.P.M.
DG-4	4	380-500	300-400
DG-5	5	475-675	300-400
DG-6	6	570-750	300-400
DG-8	8	760-1000	300-400



Schematic Drawing of Engine Cooling Unit Drilling Rig

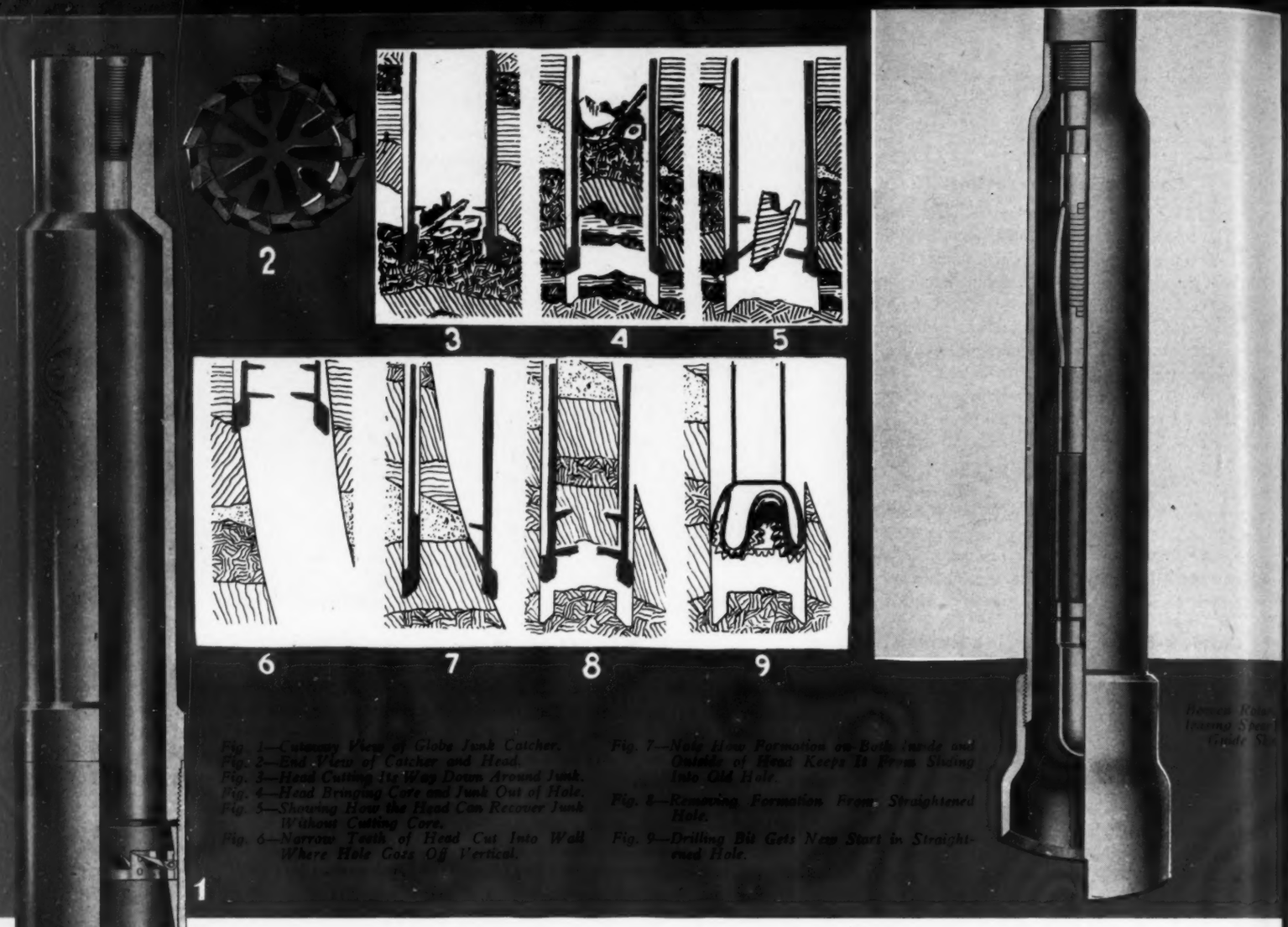


Fig. 1—Cutaway View of Globe Junk Catcher.
Fig. 2—End View of Catcher and Head.
Fig. 3—Head Cutting Its Way Down Around Junk.
Fig. 4—Head Bringing Core and Junk Out of Hole.
Fig. 5—Showing How the Head Can Recover Junk Without Cutting Core.
Fig. 6—Narrow Teeth of Head Cut Into Wall Where Hole Goes Off Vertical.
Fig. 7—Nubs Hold Formation on Both Inside and Outside of Head Keeps It From Sliding Into Old Hole.
Fig. 8—Removing Formation From Straightened Hole.
Fig. 9—Drilling Bit Gets New Start in Straightened Hole.

Globe Junk Catcher and Hole Conditioner

THIS new advanced Globe tool was designed and engineered by Globe Oil Tools Co. to recover junk and fish of all descriptions from an oil well, and to recondition the hole if it is crooked or has been damaged. It embodies many exclusives features, such as recovering cores and fish up to 77% of hole size. It is a simple, economical, as well as a safe answer to the problems of junk and damaged holes.

The illustrations show how this modern tool recovers junk in the hole. Fig. 3 shows the head cutting its way down around the junk. In Fig. 4 it is bringing the core and junk out of the hole. Fig. 5 shows how junk or fish can be recovered without cutting core. All three illustrations show the design that permits recovering core and fish up to 77% of hole size.

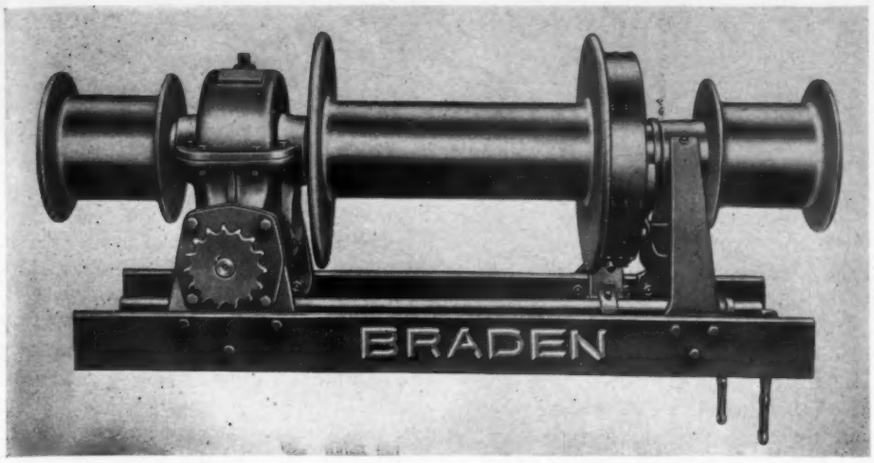
The Globe Junk Catcher is also excellent for straightening crooked holes, as shown by Figures 6 to 9 inclusive. When the point where the hole begins to go off vertical has been determined, the tool is lowered to that point and then rotated at high speed. The narrow teeth, tapered toward the inside, quickly cut into the wall on one side of the hole as shown in Fig. 6, and an entirely new hole is started. After the shoulder has been cut, the formation passing upward on the inside of the barrel helps to hold the head in place and prevent it from sliding down into the oil hole. This feature is important because it demonstrates the use of this hole straightening device. Ordinary types of bits tend to slide back into the old hole, even after a shoulder has been started, while the Globe head is held to its new course by the formation on both the inside and outside of the teeth. The tool should be run until an entirely new hole has been started, when the regular drilling bit may be used again as shown in Fig. 9.

Bowen Rotary Releasing Spear

THE Bowen Rotary Releasing Spear with skirt and guide is especially designed for use in catching drill pipe or tubing. It is a valuable tool for use on fishing jobs where adverse hole conditions exist, and where the top of the drill pipe or tubing is leaning against the side of the hole. It provides an effective means of guiding the fish to the center of the hole and up over the spear where it can be held and pulled out of the hole.

The tool comprises essentially a standard pack-off type spear assembled within a skirt of sufficient diameter to slip down easily over the drill pipe or tubing. As shown in the illustration, an oversize guide is threaded to the skirt at the bottom to assist in picking up the fish and centering it, and a top sub provides connection between the spear and the run-in string. Oversize guides are removable so that a guide of any dimension may be installed on the skirt.

When run in the hole, the tool is rotated slowly immediately upon contact with the top of the fish to enable the guide to center the fish in the hole. Then, the tool is lowered in the usual manner so that the spear enters the fish its full length. The friction springs contact the inner walls of the fish, carrying the cage up and against the shoulder on the body and bringing the slips to their uppermost position. The string is then rotated a sixth of a turn to the left. The springs hold the cage and slips stationary, and the rotation places the tapered faces of the body directly beneath the slips. Thereafter, when upward pull is exerted, the slips are expanded against the wall of the fish and the hold is secure. Easy release is effected by simply dropping the weight of the fishing string against the tool and rotating a sixth of a turn to the right to bring the neutral slots behind the slips.



New Braden Winch

BRADEN WINCH, Model M12-18B, was designed to meet certain specific requirements of the armed forces. For more than two and one-half years, due to urgent government orders, the M12 could not be supplied the waiting commercial field. Now, with the pressure somewhat withdrawn, this popular model is being released in limited numbers.

An added feature built into the new M12-18B is the Braden Oil Cooled, Fully Adjustable Automatic Brake. This new brake operates in oil and the entire assembly is encased in an oil tight housing, thus providing a coolant which prevents burn out of the linings and mechanical parts of the brake mechanism.

Vapor-Lift Tank Roof

THE Hammond vapor-lift tank roofs were designed to stop breathing losses, reduce filling losses and preserve product quality. It does this by providing a variable vapor space, of ample capacity, to permit the expansion or contraction of vapors thus eliminating breathing.

The variable vapor space in a vapor-lift equipped tank is positively sealed so that vapors will not escape, breathing losses will be eliminated, filling losses reduced and the quality of the stored product maintained.

Under normal conditions the vapor-lift roof will rest on the roof supports as in the conventional cone roof tank. As the volume of vapor in the tank tends to increase the roof will rise to make room for the increased vapor . . . lowering itself when the volume of vapor tends to decrease. The vapor-lift roof is designed to provide sufficient vapor space to eliminate all breathing and evaporation losses.

A single vapor-lift roof tank (available in sizes up to 100,000 bbl.) can be provided with excess vapor capacity to accommodate the breathing of additional cone roof tanks.

The outstanding feature of the vapor-lift roof tank is the simple and rugged stabilizing means provided to insure the roof being kept level at all times regardless of lateral wind or unbalanced snow loads. These stabilizers consist of gear and rack units, mounted as illustrated and synchronized by a continuous chain and cable with take-ups. Roller guides, mounted on noncorrosive bearings, insure true vertical alignment of the roof during its travel. All equipment is located outside the tank where parts are quickly accessible for inspection.

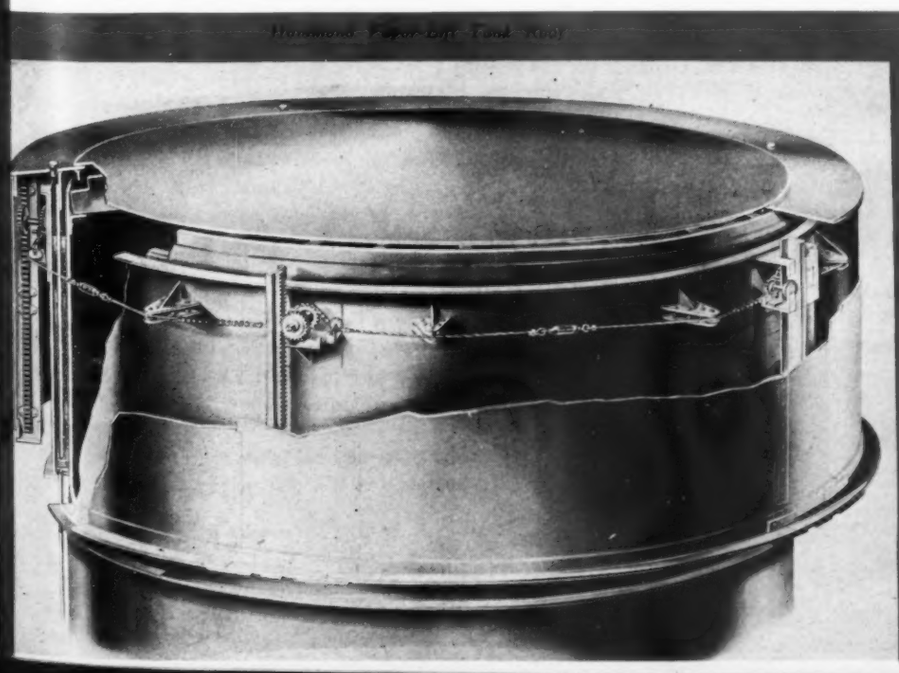
Lighting Generators for Power Drilling Rigs

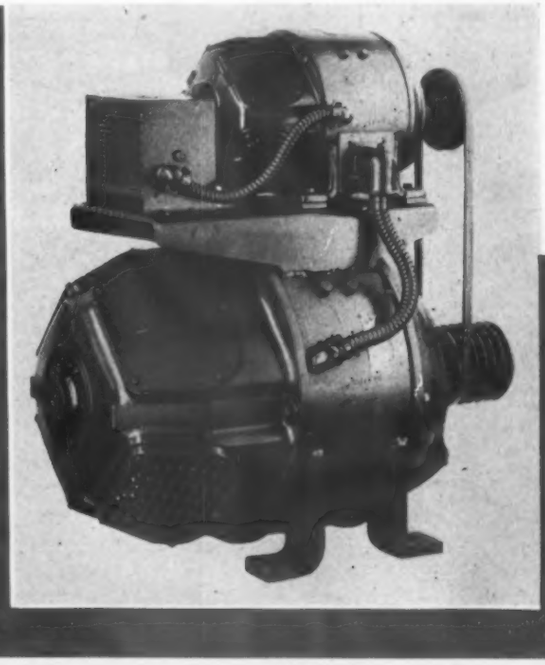
TO supply power for lighting on drilling rigs driven mechanically by internal combustion engines, General Electric offers the Thyrite-controlled direct-current generator, which may be V-belt driven from one of the main engines. This generator will hold automatically at practically constant voltage, within plus or minus 5 per cent, over a range of speed of nearly four to one, and will therefore give good voltage conditions, even when the engines are varied widely in speed when making a round trip. These generators make it unnecessary to run a separate engine-driven auxiliary power unit except when the main engines are shut down, and thus greatly reduce the cost of fuel and maintenance for the auxiliary generator.

The Thyrite-controlled generating unit (see illustration) is of ball bearing, dripproof construction, and includes a top-mounted exciter and an enclosed Thyrite resistor, all assembled as a unit and wired at the factory. Numerous ratings are available, the popular ones being, 3, 5, 7½, 10, 15 and 25 kw at 125 volts d-c, designed to maintain constant voltage and continuous full rated output at any point in a speed range from 850 to 3200 rpm. This Thyrite-controlled d-c generator eliminates the necessity of a voltage regulator or other moving parts for accurately holding lighting voltages.

The equipment includes a small, ebony-asbestos control panel on which is mounted a voltmeter, an ammeter, a voltage adjusting rheostat, a double-throw fused line switch to transfer the load to a stand-by unit when desired, and receptacles with plugs, or fused feeder switches, for the load circuits. The panel is supplied in a galvanized, sheet-steel, wall-mounted, outdoor enclosure with hinged door and provisions for a lock.

G-E Ball-Bearing Variable-Speed Constant-Voltage "Thyrite"-Controlled Generator-Exciter Set of Dripproof Protected Machines.





New Type Pulsation Damping Unit

By Henry W. Stoll

Sales Engineer, Taylor Instrument Companies.

THE measurement of pressure and flow can become quite difficult when changes occur in rhythmic fashion, particularly so when they are of an oscillatory nature and possess amplitudes which are equal to or exceed one percent of full scale range. Under such conditions, chart records and control settings may deviate considerably from the ideal.

Difficulties associated with the measurement of pulsating pressures may be overdone in various ways. First and foremost is the location of the pressure tap. If design permits, it should be removed as far as possible from the device producing the oscillations,—for by so doing, advantage is taken of the natural damping resulting both from fluid friction and the higher capacity of the longer runs of pipe. A second method is to select an instrument with a sufficiently large range interval as would prove convenient so as to reduce the percent effect which the amplitude would have on the average line pressure. A third method is the introduction of liquid seals having a relatively high viscosity so that damping might be easily effected with the adjustment of needle valves.

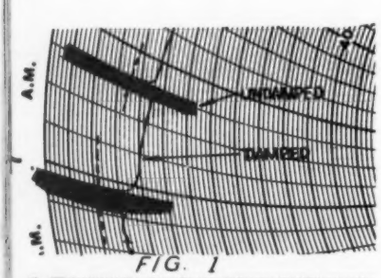


FIG. 1

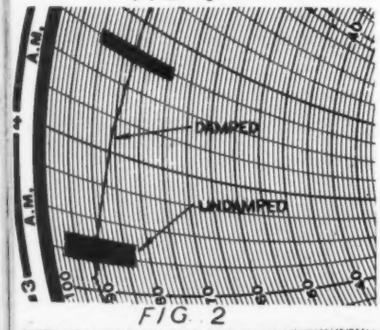


FIG. 2

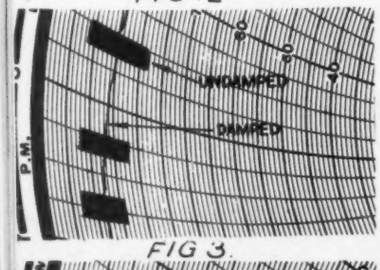


FIG 3.

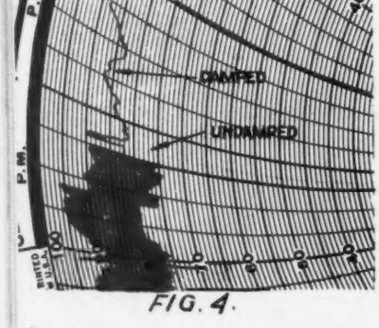


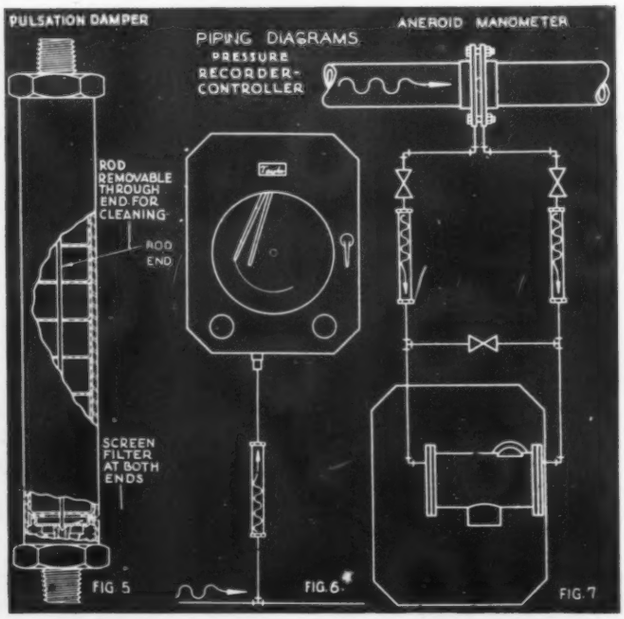
FIG. 4.

Performance Characteristics

Conditions oftentimes exist, however, when the above suggested methods cannot be employed and the need of a pulsation damping unit is then clearly indicated. It is the purpose of such a unit to receive the pulsation and deliver instead a pressure which represents a true average value. To effect the removal of the pressure wave, various damping devices are supplied and when analyzed may be classed into two different types; the variable orifice, and the fixed orifice devices.

The variable orifice type operates similar to a simple pressure reducer and smooths out the pressure wave by decreasing the orifice area in direct proportion to the amplitude of the pressure wave. This is accomplished by introducing a tapered pin in a circular orifice. During the "closing" operation, there is developed a pressure loss which causes the pressure instrument to indicate a value which is less than the true average. Figure 1 shows a typical chart record of this variable orifice type. The pressure tap is located 6 feet from the exhaust port of a steam driven air compressor. The dotted line is added to show the true average pressure and note that the recorded pressure deviates from the actual average by 6.1%.

The fixed orifice type, such as a long tapered needle valve, or a length of capillary, takes advantage of the pressure drop associated with the flow of any material through a constriction. The orifice area and length can be adjusted to suit the application and the resulting indication of the pressure instrument will depend both on the volume of the pressure element and the flow characteristics of the constriction. When a needle valve is employed, the resistance to flow is determined by the direction of flow and hence if the pressure element has sufficient volume, the indicated pressure will be either above or below the average value, depending on the installation. When needle valve damping is used on conjunction with a Bourdon coil type of pressure element, the volume in this particular case is sufficiently small so that this type of damping works out quite satisfactorily. Figure 2 is a chart record showing the performance characteristic of a needle valve used as a pressure damping unit.



The volumetric change of the pressure element is very small. In order that a pressure drop can be developed across a constriction, its area also must be relatively small. This feature becomes a decided disadvantage when it is considered that in most all industrial applications minute solids are ever present which will quickly plug up the orifice. In addition, the adjustability of the device makes it a plaything to the inexperienced and such action could and has caused serious difficulties in the operation of related equipment.

To overcome the difficulties associated with the variable orifice type and the fixed orifice type, Taylor Instrument Companies have developed a new and different type of pulsation damping unit. This device has been thoroughly field tested. It is universal in application, non-adjustable and delivers an output pressure which is essentially equal to the average flow of the pulsating input pressure. Figure 3 illustrates graphically its operation. Note that the "damped" pressure is a true average of the undamped pressure wave. Figure 4 shows the effect of the damping unit when used in conjunction with a Taylor aneroid type flowmeter measuring the flow of pulsating air.

Principle of Operation:

The Taylor Pulsation Damping Unit has no moving parts, nor is there need for any external adjustments to be made. It consists of a series of alternate small capacities or volumes and orifices. (See Figure 5) As the pressure wave enters the device, a differential occurs across the first orifice which causes a flow through it, thus raising the pressure in the adjacent chamber. This in turn causes a flow through the next orifice producing similar effects except with decreased intensity.

While this "above average" valve of the pressure wave is making its way through the series of chambers, the pressure drops below the average value (since it is a pulsating one), which causes a reversal of the flow process. Thus, it can be said that the various capacities "breathe" with decreasing intensity as the waves pass through the damper until finally a point is reached where the pressure level lies just about at its average value. It is important therefore, that each individual orifice provide the same drop for the same flow regardless of direction.

Rapid pulsations are absorbed in the first few capacities, and as the frequency is decreased the

number of capacities needed is increased. The Taylor pulsation damping unit will absorb pulsations of frequencies which exceed one cycle per second, and when subjected to such conditions its full length is utilized. The amplitude of the pressure wave influences the effectiveness of the damper after it has reached a certain magnitude. The greater capacity of the measuring element, the greater the damping unit's ability to absorb the pressure wave.

Construction Features:

Generally associated with the use of small orifices is the experience of continual plugging. However, this objection does not assume its usual importance when the device is located adjacent to the instrument. Pressure measurement, whether it be absolute, gauge or differential, is "dead end" service; and hence there is no flow of material other than the volume change resulting from the deflection of the pressure sensitive element. To overcome the effects of solids and pipe scale which always seem to make their way to small orifices in spite of the extremely small flow in the pressure measurement lines, fine mesh screens have been provided both at the entrance and exit of the damping unit. In addition a rod, which passes axially through the series of orifices, can be readily removed thus exposing a large orifice area for simple and effective cleaning. Figure 4 is a "cut away" view of the pulsation damping unit and shows the location of the screens and rod.

The device is completely free of gaskets. The end caps are welded to the tube in order to provide a lead-proof construction. The orifices are "cup shaped" and when pressed into place provide an inner lining to the tube. Cups and rod are 18-8, the tube and end-pieces are steel. The damping unit is subjected to a static pressure test of 3000 psi and bears a working pressure rating of 1500 psi.

Installation Features

The pulsating damping unit should be located as near the pressure instrument as piping will conveniently permit. (See Figure 6) Observing this practice will minimize the loss in response time, as well as reduce the possibility of leaks between the damper and the instrument. Obviously, if a leak exists in this section the pressure indication can be considerably in error.

If piping will permit, the pulsation damping unit, should be in the vertical position with the pressure line entering at the bottom in order that the solid materials may not drift to the device and plug the entry. When used in conjunction with differential pressure measuring instruments, they should be located as shown on Figure 5. This arrangement makes possible an easy quick check of the instruments "zero" position as well as insuring against over-ranging when the instrument is put "on the line."

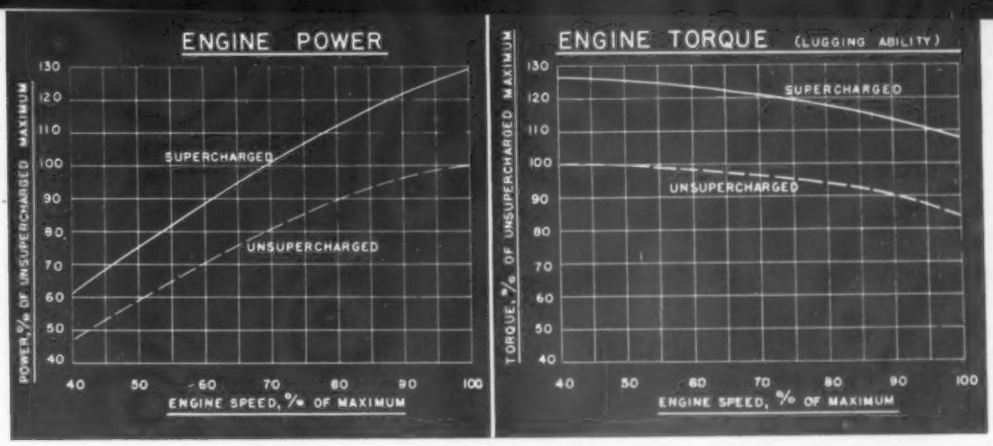


Fig. 1

Coming Era of the Supercharger

THE war has unquestionably proved that the supercharger is a success with both gasoline and Diesel engines, and this application will no doubt continue to increase. In fact, the recent book by R. T. Sawyer on the "Modern Gas Turbine" declares that the aviation or Diesel engine without a supercharger is becoming obsolete.

The power output of a given Diesel or gasoline engine is limited by its ability or inability to "breathe" air. In order to produce power from an internal combustion engine, fuel must be combined with the correct weight of air or oxygen to produce the energy necessary to push the piston. Air is as essential to an engine as fuel.

Under normal operating conditions, an unsupercharged engine will draw in on the intake stroke a volume of air equal to about 90 percent of the cylinder displacement. There is a loss of approximately 10 percent due to pressure losses, heat transfer, and the mechanical difficulties of displacing the exhaust gas with fresh air. At high speeds, this so-called volumetric efficiency may be as low as 70 percent.

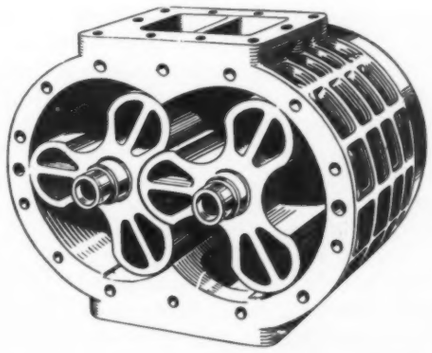
With a supercharger this volumetric efficiency is increased. Instead of only 90 percent, as much as 130 percent of the normal air intake can be injected into the cylinders—an increase of 40 percent. This means that 40 percent more fuel can be burned and theoretically 40 percent more power developed at the final drive or drawbar.

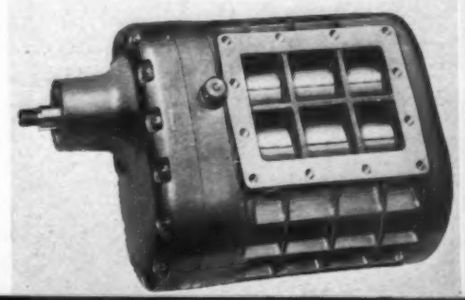
The relative efficiences of unsupercharged and supercharged automotive engines is graphically shown on the accompanying chart—Fig. 1.

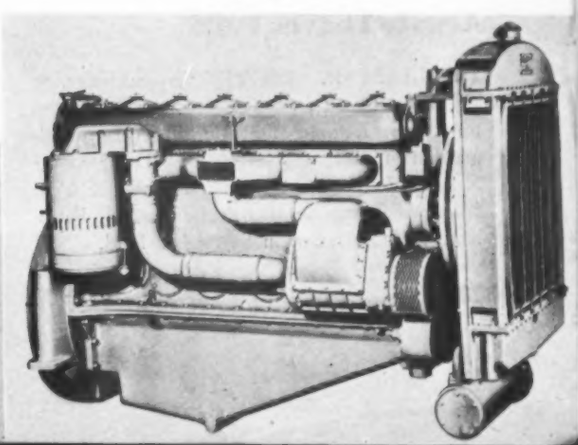
A kind of supercharger that is finding use for automotive engines of trucks, buses, small locomotives and for any tractive purposes, drilling rigs, pumping service, power shovels, bulldozers, generating sets, marine engines, etc., is of the positive displacement rotary type, and consists essentially of two moving parts—two interlocking impellers or rotors (Fig. 2) which may be driven from the engine. The complete supercharger is shown in Fig. 3, and the engine with supercharger in place is seen in Fig. 4. The use of superchargers in these services aids the engine in giving a high torque over a wider speed range, especially at the low speeds usually required by these heavy duty engines.

For the engine builder, supercharging contributes materially toward increasing power output per pound of weight. A lighter, more compact engine for a given horsepower rating has a wider range of usefulness is the result. It adds greatly to the flexibility and adaptability of the unsupercharged engine.

For the engine user, supercharging provides a reserve of extra power above the unsupercharged rating which enables engines powering boats, trucks, power shovels, pumps, etc., to carry overloads without excessive strain on the engine. It permits the use of a smaller engine for the same horsepower output, resulting in lower costs of original equipment and maintenance, reduced weight, and more available space for cargo.







Left Fig. 2:—Supercharger With End Removed Showing Rotors.
Lower Left: Fig. 3—Complete B-W Supercharger.
Below: Fig. 4—Engine With B-W Supercharger in Place.

ECHOES FROM THE WASHINGTON OIL FRONT

Heads Foreign Division

Roy F. Hawkins

ROY F. HAWKINS has been named as director of PAW's Foreign Supply and Distribution division. He succeeds William D. Crampton, who had been director of the division since it was organized in November last and who is now returning to service with Standard Oil Company (N. J.).

Mr. Hawkins went to PAW after three years as executive secretary of the Petroleum Supply Committee for Latin-America on leave of absence from the Standard Oil Co. (N. J.). Previously he was managing director of Standard's subsidiary in Genoa, Italy, and before that assistant general manager of Standard's subsidiary in Buenos Aires, Argentina. Through his prewar background and his experience in handling the affairs of the Petroleum Supply Committee, Mr. Hawkins is thoroughly familiar with foreign requirements and he is regarded as the best equipped man who could be selected for the post. In the words of Deputy Petroleum Administrator Ralph K. Davies his appointment will assure "able continuity in the work of the division."

Public Relations Director

LUDWIG CAMINITA, JR., who has been with PAW since January 1942, has been named director of public relations to succeed Spencer W. Robinson of Houston, Texas, who recently resigned. Through the many changes that have taken place in the public relations division Caminita has remained the wheel horse of the organization. He was appointed assistant director of public relations in April 1943 and has been acting director since last December.

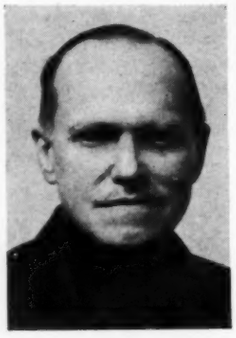
Argyle Leaves PAW

WILLIAM R. ARGYLE of Swarthmore, Pa., has resigned from PAW as associate director of the Refining Division to return to his position of assistant manager of refining of the Sinclair Refining Company of New York City, from which post he was drafted by the Petroleum Administration in September 1943.

From the time Argyle took office he was directly concerned with the operations of all United States refineries, both from the standpoint of crude runs and oil production. He directed arrangements for all changes in specifications of products, and whenever the Army or Navy wanted special petroleum products, he set up the machinery to determine how such products could be refined and where.

Argyle was born in Spanish Fork, Utah, and is a graduate of the University of Utah. From 1918 to 1920 he was employed as a physicist by the Bureau of Mines. He became associated with the Sinclair Refining Company in 1920.

Maddox in the Pacific



William J. Maddox

WILLIAM J. MADDOX, chief of World Petroleum's Washington Bureau, is now on an extended tour of the Pacific which is being conducted by the United States Navy. The purpose of the trip which includes the main island bases is to obtain first hand information concerning operations in the area that now becomes the most important theatre of war with particular attention to the part played by petroleum products in Pacific operations and the methods by which these vital supplies are handled and moved to the fighting fronts. The first of Mr. Maddox's articles is expected to appear next month.

Trade Agreement Act

REPRESENTATIVE DOUGHTON of North Carolina, Chairman of the Ways and Means Committee, is ready to push his bill (H. R. 2652) providing for a 3-year extension of the President's authority to enter into trade agreements with foreign countries, which expires June 12. Of considerable concern to some sections of the oil industry is the provision of the bill that would permit a further 50 percent cut in the excise tax on crude oil and fuel oil imported into the United States.

Previously the excise tax was reduced in the trade agreement with Venezuela as to an amount equalling five percent of the domestic refinery runs in the United States for the preceding calendar year. On that amount the tax was cut from 21 cents to 10½ cents a barrel. Under the Doughton bill the tax could be reduced to 5¼ cents.

Oil Men Wanted

MAJ. GEN. E. B. GREGORY, Quartermaster General, is beating all branches of the Army Service Forces for officers who have had a civilian background in oil. As he finds them he is having them segregated into a group for special training for gasoline and oil supply work for the Army.

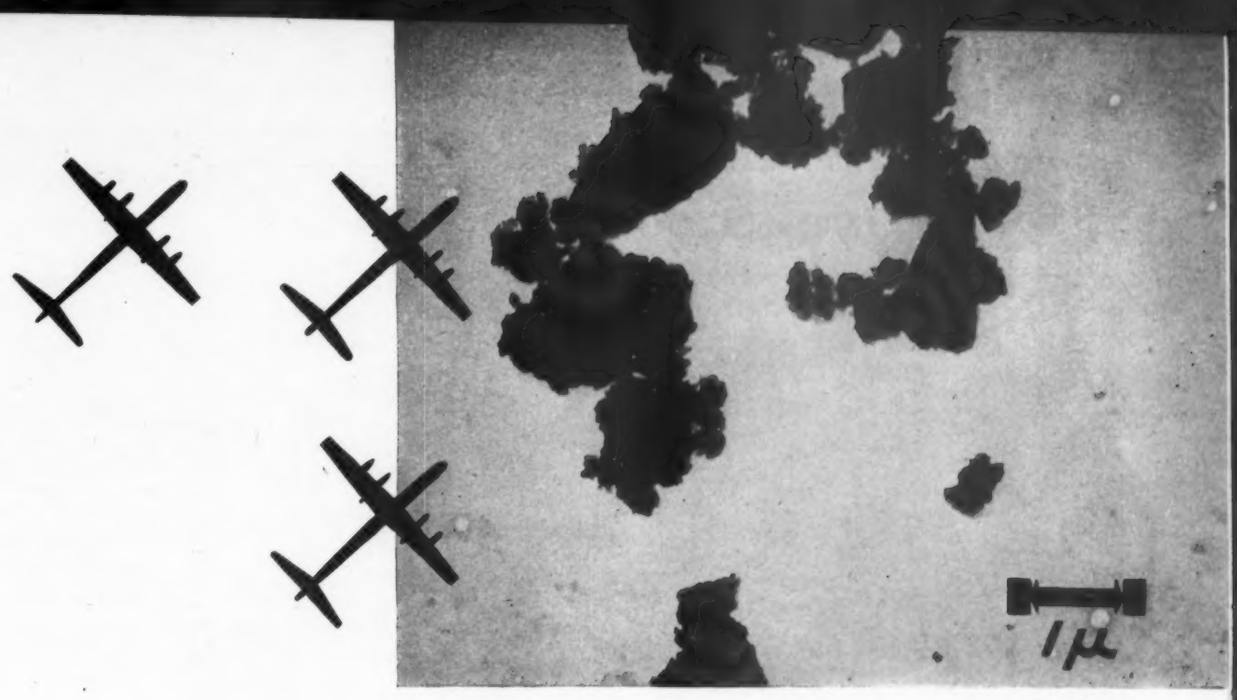
"More officers for gasoline and other petroleum products supply work are steadily in demand overseas, especially in the Pacific theaters", according to General Gregory, "and it is a function of the Fuels and Lubricants Division, Office of the Quartermaster General, to furnish fully qualified officers for such duty".

It is not a new policy for the Army to place responsibility for handling the huge task of military oil products supply in the hands of oil industry personnel. More than 90 percent of the officers in the Fuels and Lubricants Division have had practical training in oil company employ. Some of them have had 25 years and the average for the Division is about 10 years.

Robinson Joins Davis-Dyke

Spencer W. Robinson

SPENCER W. ROBINSON who recently resigned from his position as Director of Public Relations for PAW has joined the staff of Davis-Dyke & Company, prominent advertising agency of Houston, Texas. Mr. Robinson has been closely identified with the oil industry for more than twenty-five years, starting from the time of the Goose Creek boom in 1918. For several years he was associated with Gulf Publishing Company, serving as advertising and sales manager of its publications and later as vice president and editorial director. He has been active in civic affairs in Houston and was a member of the group that developed the council-manager type of government in that city. His interest in city government temporarily interrupted his connection with the oil industry when he was elected to the Houston City Council in 1942, a position he resigned early in 1944 to accept a call from Secretary Ickes to head the Public Relations Division of the Office of Petroleum Administration for War. In his new position he will continue his association with oil industry affairs through his contact with the large number of oil equipment and service companies represented by the Davis-Dyke agency.



B-29s WING TOWARD TOKYO

This might be flak or a Jap-held atoll. Actually, it is a micrograph made with our electron microscope showing the *UOP Synthetic Fluid Cracking Catalyst* magnified 14,000x. The small scale at the side indicates 1 micron or about 39 millionths of an inch. Laboratory studies such as these improve aviation gasolines so that B-29s *can* wing to Tokyo.

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Foreign Oil Legion

Lt. F. M. Kahm

William D. Crampton

THE unusual honor of a direct commission in the field, moving him from Sergeant to Second Lieutenant, has been conferred on Frederick M. Kahm of Bridgeport, Conn., who is with the Chinese Combat Command in the interior of China. Following his graduation from the Warren Harding High School in his native town Lt. Kahm entered the employ of the Atlantic Refining Company in Norwalk, Conn. At the time when he joined the Army in January 1942 he was directing a sales promotion training course conducted by the company. Now he is instructing Chinese in the handling and maintenance of motor equipment. His preliminary training was received at Fort Bragg, N. C. and the Holabird Ordnance Depot near Baltimore, Md. where he served as instructor before going out to India. Shortly after his arrival there, in September 1943 he was flown over the "Hump" to a post in China.

Until the recent opening of the Stilwell (Ledo-Burma) road all equipment and supplies had to be flown into China. There was a great shortage of motor equipment and the job of maintenance and repair was a difficult one. Supervision of this work was assigned to Lt. (then Sergeant) Kahm and he has applied to Chinese workers the same methods of training that he learned in the United States. For his services with the C. C. C. Lt. Kahm is entitled to wear a bronze star on his Asiatic-Pacific campaign ribbon.

WILLIAM D. CRAMPTON, who has been a member of the Petroleum Administration for War since August 1941, first as a consultant, later as chairman of the Foreign Operating Committee and then, following its reorganization, as director of the Foreign Supply and Distribution Division, has resigned his position to return to service with Standard Oil Company (N. J.). Prior to the war, Mr. Crampton was in charge of Standard's operations in France as chairman of the management committee and vice president and managing director of Standard Francaise des Petroles with headquarters in Paris. With the end of the European conflict close at hand permitting the restoration of the company's properties and resumption of peacetime activities, Mr. Crampton will shortly return to his former post.

WHEN the U. S. Army invaded North Africa Col. Stacy Adams went along as Petroleum Officer in that important campaign which not only marked a turning point in the war against the Axis but was signalized by the introduction of new and effective methods of moving oil supplies to the fighting fronts. He served in the same capacity when the war moved on to Sicily and Italy. Later he was entrusted with a special mission to the Middle East and after the historic landing in southern France he served as liaison officer between Allied Force Headquarters and the Supreme Headquarters of the Allied Expeditionary Force. In this capacity he was operating on familiar ground for he was a member of the first expeditionary force sent to France in World War I, serving as a Captain in the Engineer Corps.

After the close of that war he remained in Europe and in 1919 joined the Sinclair Oil Company as one of its European representatives. For several years he was stationed in Brussels and later in Paris in charge of Sinclair marketing operations and he returned to the main office in New York after the German occupation of France.

Col. Adams is now in the United States on terminal leave and will shortly resume his position as assistant to Leland Stanford, vice president of Sinclair in charge of foreign operations.

GUESTS from outside the United States who attended the March meeting of Los Angeles Nomads included Florent H. Bailly of Pantepec Oil Co. and R. L. Jewell of Caribbean Petroleum Co., Venezuela; Lt. J. R. Coleman, formerly with Mene Grande Oil Co., Venezuela; Z. W. McCoy, Colombian Petroleum Co., Colombia; Alex Lae, Trinidad Leaseholds, Trinidad; George J. Betts, International Ecuadorian Petroleum Co., Ecuador; Milton Hobbs, Paul Hughes and Hobart L. LaMar, formerly with New Zealand Petroleum Co.; Orville W. Bryant, formerly with Australian Government Oil Fields; Bob Harcus, Burma Oil Company, and C. H. Strickland, Standard Oil Co. (N. J.) Egypt.

Prof. John F. Dodge of the University of California who recently returned from a trip to the Caribbean and Mr. Bailly, who was born in Caracas and has spent much of his life there, gave interesting talks on Venezuela and expressed the view that it would be one of the most important markets for oil industry equipment for years to come. Walter Wells, chairman of Lane-Wells, presented an hour of motion pictures in color made in Guatemala, Ecuador, Peru and Chile which not only were extremely interesting but demonstrated his artistic ability as a photographer. Hi Cassidy was master of ceremonies and presented the newly elected officers of the chapter.

AMONG promotions recently announced by the Central Pacific Base Command was that of Willis Kenneth Daggett from Captain to Major, Corps of Engineers. Major Daggett, whose home is in Ardmore, Okla. was born in Tecumseh, Nebraska, and graduated from the Colorado School of Mines in 1935. He was a member of the O.R.C. and was employed by Lane Wells Company as a petroleum engineer before being called to active duty on May 1, 1942.

AMONG visiting oil men in attendance at the April meeting of Los Angeles Nomads were John S. Parker and G. B. Yarberry of Tropical Oil Company who were preparing to leave shortly for Colombia; R. B. Block who is with International Petroleum Company in Peru; J. W. Mitchell of the International Ecuadorian Petroleum Company, Ecuador; Donald H. Meek of the U. S. Navy who has been assigned to Alaska for development work on the Alaskan Naval Reserve, and John Daniell of McCarthy Company who was formerly connected with the Army's Canol project in Canada.

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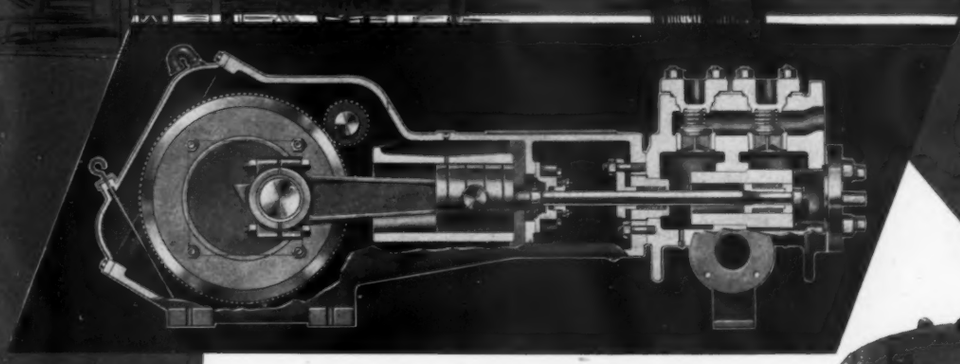

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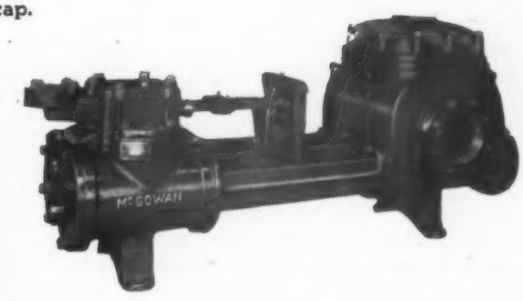

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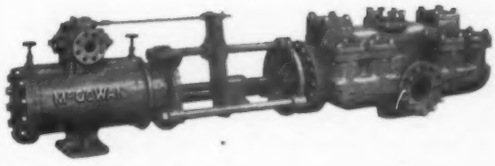

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WRITE FOR CATALOG 200

Oil Company Staff Changes

S. B. Irelan

S. B. IRELAN who has been associated with Cities Service Company and affiliates for thirty-six years has been elected to the company's board of directors. His election fills a vacancy caused by the resignation of Valentin R. Garfias of Mexico City.

Known to his friends as "Mike", Irelan was born in the little town of Idaville, Ind. With an electrical engineering degree from Purdue in his pocket, he took his first job in 1909 with the Denver Gas & Electric Co. of Nevada, a Cities Service subsidiary. He has been with the Cities Service system ever since, and has worked up the ladder in such jobs as cadet engineer, statistician, department manager, general manager and secretary-treasurer. At various times he has been with the Fremont Gas & Electric Co. of Colorado, the Henry L. Doherty Co. of New York, The Montgomery Light & Water Power Co. of Alabama, the St. Joseph Railway, Light, Heat & Power Company of Missouri and many others. As president of the Cities Service Gas Co. of Oklahoma, he has helped to make that company one of the largest integrated gas companies in the area.

H. S. CHASE, vice president in charge of manufacturing, Eastern division, and Drew L. Hines, vice president in charge of transportation and supplies, have been elected directors of Tide Water Associated Oil Company. Both men have had more than twenty years of continuous service with the company. K. R. Hankinson, vice president and treasurer, has been appointed a member of the Eastern division operating committee and Mr. Hines has been appointed vice chairman of the Eastern division operating committee, of which B. I. Graves is chairman.

R. E. McDANIEL has been promoted to assistant division manager of the West Virginia division of the Standard Oil Company of New Jersey.

He succeeds C. A. Newland who has been made assistant division manager of the North Carolina division. Mr. McDaniel started his career with the company in June, 1924, as a service station salesman in Charleston. Subsequently, he became a general salesman and later was made a district manager. He became merchandising assistant of the division last August.

AT the annual meeting of the stockholders of the Shell Oil Company, Inc., P. E. Lakin, vice president in charge of marketing, New York, and Dr. E. F. Davis, vice president and the company's chief consulting geologist, Los Angeles, were elected directors.

In thirty years with Shell, Mr. Lakin has risen from a clerk in the company's Seattle office to his present position by being successively cashier, chief clerk and salesman of the Seattle division office, assistant division manager, president of a subsidiary company, general sales manager, and finally vice president in charge of marketing. A native of Orting, Washington, Mr. Lakin got his schooling in nearby Tacoma and attended the University of California.

Dr. Davis, well known in petroleum and scientific fields, also attended the University of California and received his doctor's degree from that institution. He joined Shell's exploration department in 1919, and rose to be vice president in charge of geology and production in Shell's Pacific Coast territory. Last August he became chief consulting geologist for the company's nationwide activities.

P. E. Lakin

C. M. BYERS, manager of the North Carolina division of the Standard Oil Company of New Jersey, has been promoted to manager of farm sales in seven southern states, and J. L. Wright, assistant division manager, has been advanced to manager.

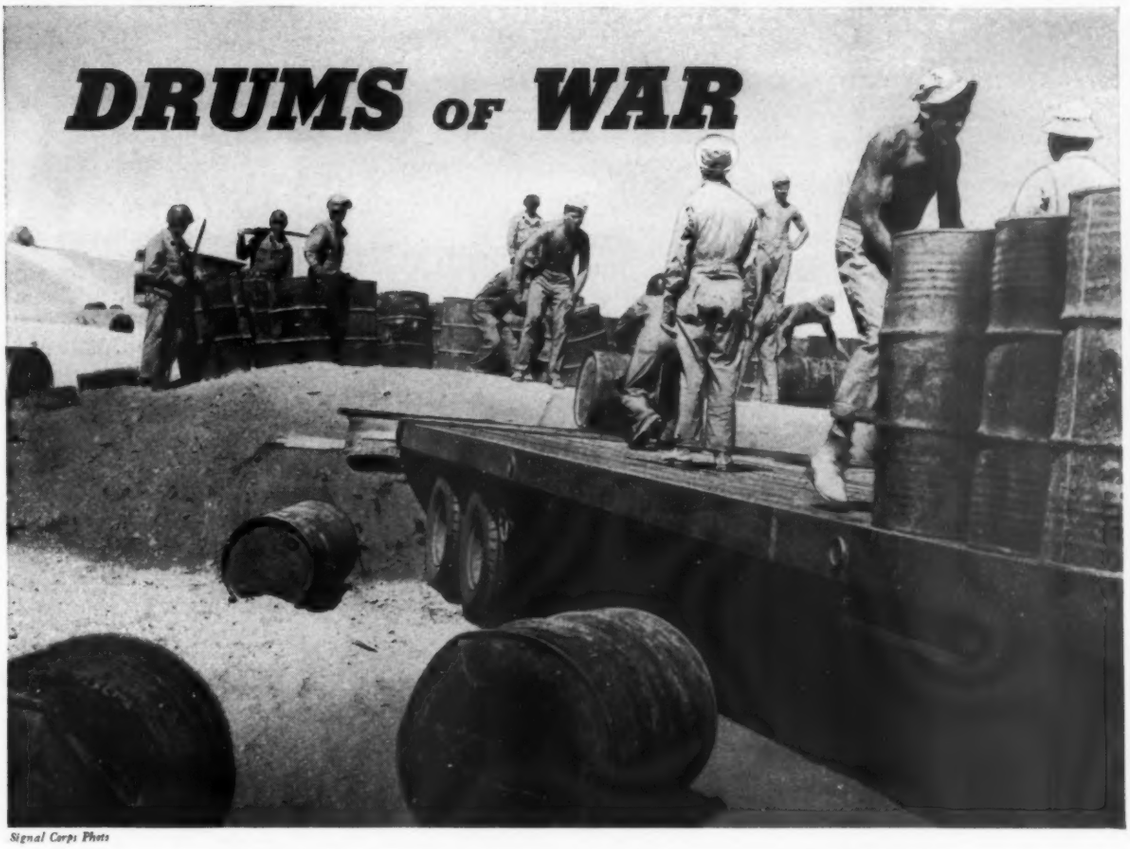
In his new post, Mr. Byers will have charge of farm sales in Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Arkansas and Louisiana, with headquarters in Richmond, Va. He leaves North Carolina after nearly forty-three years of service with the Standard Oil Company in that state. For a quarter of a century he has managed the business of the company in the state, having succeeded J. A. Fricker in that post in 1920.

Mr. Wright's career with the company spans a period of more than thirty years. He began as a clerk in the Wilmington office in 1914, advancing to managership of the district through the positions of assistant cashier, chief clerk and general salesman. In 1938 he was promoted to sales manager, and became assistant division manager in 1941.

WILLIS GORDON VIOLETTE was elected to the presidency of Standard Oil Company (Kentucky) following the annual stockholders' meeting on March 15th. A native Kentuckian, born on a farm in Grant County, he has been associated with the company for over forty years, having made his start in Cincinnati in 1904 as secretary to Crittenden T. Collings. Shortly thereafter he was transferred to Covington, Ky. and in 1912 he moved to the executive offices in Louisville where he has filled positions of growing responsibility ever since. In June 1920 Mr. Violette was elected to the directorate of the company. In November of that year he became a vice president and in March 1944 he was named an executive vice president. He is active in local community affairs, is a member of the Louisville Country Club. His home is in Mocking Bird Valley.

(*Continued on page* 88)

Willis Gordon Violette



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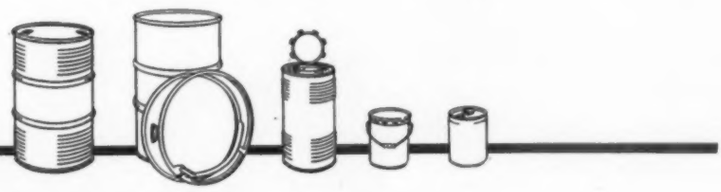

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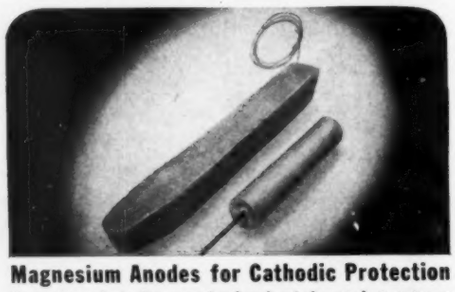

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OIL COMPANY STAFF CHANGES

(*Continued from page 74*)

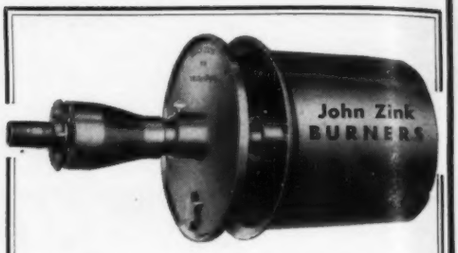
HERBERT WILLETTS, since 1936 manager of the New York City division of the Socony-Vacuum Oil Company, has been appointd assistant general manager of eastern marketing. He succeeds A. L. Nickerson, who has been transferred to the foreign trade department. Mr. Willetts joined Socony-Vacuum in its Albany division in 1923, after being graduated from Union College.

Quentin W. Regestein has been named general manager of the New York City Division. A graduate of the University of Pittsburgh, Mr. Regestein has been with Socony-Vacuum since 1931. In 1943 he became District Sales Manager of the northern New Jersey sales district. For the past year he has been serving as Chief of the gasoline rationing branch of the OPA in Washington.

H. W. FISHER, manager of the Chemical Products division of the Standard Oil Company of New Jersey, has been elected a director of the company. Mr. Fisher was graduated from M. I. T. in 1927 as a chemical engineer, and started work immediately with the Standard Oil Company of Louisiana in Baton Rouge, working on high pressure hydrogenation of oil and coal. He continued work on hydrogenation development until after plants had been constructed at both the Baton Rouge and Bayway refineries, and then was transferred to what are now known as the Esso Laboratories of Bayway.

In 1936, recognizing the importance of its chemical products business, Standard organized a Chemical Products department with Mr. Fisher as manager. This department has grown rapidly, and today the company's interests include such diverse products as rubber, alcohol and special lubricating oils, all synthetic. Currently the company is operating plants worth millions of dollars for the manufacture of synthetic rubber raw materials and butyl rubber.

H. W. Fisher



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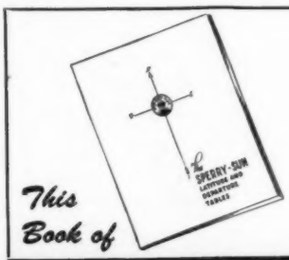

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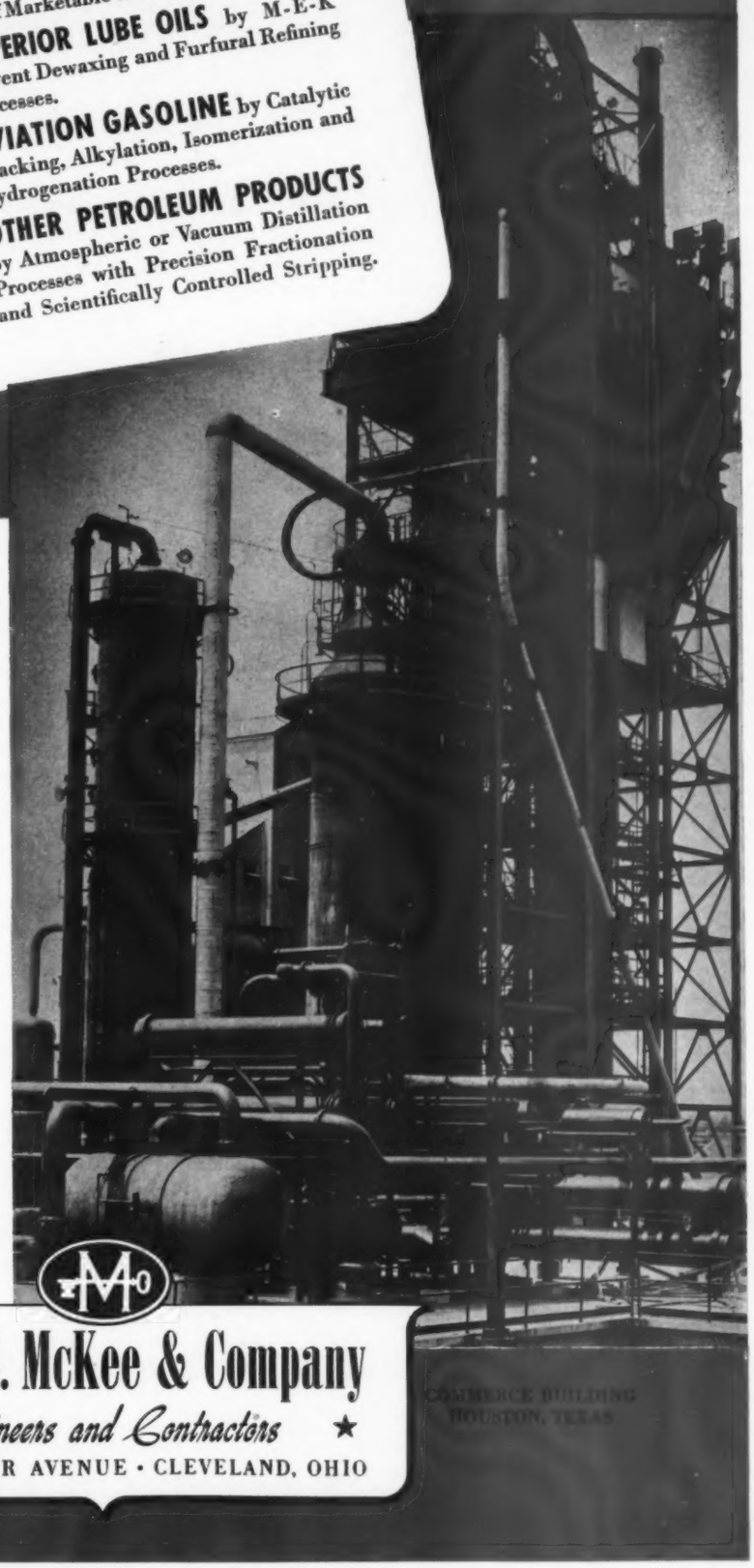

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ASK LEGISLATION ON DRILLING COSTS

(*Continued from page 38*)

Bureau of Internal Revenue and received an assurance that any change would not be retroactive so far as the Treasury's attitude was concerned. Commissioner of Internal Revenue Joseph D. Nunan, Jr., wrote to Mr. Disney on March 29th as follows:

"Receipt is acknowledged of your letter dated March 28, 1945, with reference to the procedure which the Bureau proposes to follow in the application of the regulation relating to intangible drilling and development costs for oil and gas wells.

"The Bureau proposes to continue to follow the provisions of Section 29.23 (m)-16 of Regulation 111, and corresponding provisions of prior regulations notwithstanding decision in case of F. H. E. Oil Company. In the event of a clarification of the law impelling such a change, in no event would such a change be retroactive unless so directed by Congress."

Russell Brown's comment was that while the decision is "encouraging" it is not a full answer to industry's problem. "Every possible attempt," he said, "should be made to obtain correction of the decision of the court in the jurisdiction from which it came but this will not prevent similar attacks from other sources.

"In my judgment, the real remedy is for Congress to make clear its intention to preserve in substance the regulation originally made to meet a condition that required specific treatment. The history of the industry, operating for more than 25 years under the tax principle embodied in the regulation which was held invalid, justifies Congressional support to the effort to have this question cleared up for all time."

Mr. Brown looks on the issue as broader than the oil industry. Many operators, he believes, will hesitate to go ahead with their full development and drilling programs until the cloud of uncertainty has been removed, and this will have a wide public effect. Already reports are coming in that many rigs are being stacked and that producers are trimming their drilling programs to a minimum as a result of the court decision.

"It will be noted on reading the opinion", said Mr. Brown, "that the Court held that the Congress did not provide for the deductions which the Court has held to be improper; that it was merely a regulation written by the Treasury Department. The fact is that the question was raised several times before appropriate committees of Congress. The last time was in 1942 when the Senate Finance Committee and the House Ways and Means Committee heard the entire case of depletion and intangible drilling costs. The Treasury Department then sought to obtain an express prohibition as to the expanding option and argued the point at length. The very refusal of these committees to amend the law in the manner proposed by the Treasury Department appears to me to be legislative approval of the regulation which now has been held invalid by the Court.

"The Court took notice of a conflict within the Treasury Department, saying that the 'legislative mind' of that department seems determined to maintain the option while the 'administrative mind' of the same department, 'represented by the Commissioner and his lawyers, and supported generally by the courts, is bent on whittling it away' ".

Congressional reaction to the court's decision was promptly registered particularly by members from oil states by the introduction of five bills designed to protect the option. Representative Reed of New York introduced two bills: H. R. 2720 and H. R. 2825; Carlson of Kansas offered H. R. 2796; Stigler of Oklahoma, H. R. 2765; and Wickersham of Oklahoma, H. R. 2841. Reed's second bill, H. R. 2825, appears to be most satisfactory in general to the oil men.

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